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GREATER TORONTO AREA 3Rs ANALYSIS

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Ministry of Environment and Energy

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EXECUTIVE SUMMARY

Background and Purpose

With the introduction of the Waste Management Act (WMA), 1992 by the Province of Ontario, the Interim Waste Authority (IWA) was empowered to conduct environmental assessments (EAs) to locate three landfill sites in the Greater Toronto Area (GTA). These three landfill sites will provide waste disposal capacity to Metro Toronto and the Regions of Durham, York and Peel, for at least 20 years. The Region of Halton recently completed a landfill site selection process and was not included in the IWA EAs.

The WMA also directs the Minister of Environment and Energy to provide to the IWA waste diversion estimates for use in the IWA EAs. These estimates were provided by the Minister in May 1992.

The GTA 3Rs Analysis provides analytical support to waste diversion estimates provided, and also serves to identify and evaluate alternative 3Rs systems (comprised of combinations of 3Rs programs, technologies and practices) that could reasonably be implemented in the GTA. The potential for each 3Rs system identified to divert waste over the 20-year minimum life expectancy of the GTA landfills is also determined.

Study Approach Overview

An array of conceptually different 3Rs systems was identified for addressing residential wastes, as well as for institutional, commercial and industrial (IC&I) wastes. Including the Existing (do-nothing alternative) and Existing/Committed system, six residential and six IC&I 3Rs systems were developed from the available 3Rs components:

Residential		*IC&I*	
System 1	*Existing*	*System 1*	*Existing*
2	*Existing/Committed*	*2*	*Existing/Committed*
3	*Direct Cost*	*3*	*Extended 3Rs Regulations*
4	*Expanded Blue Box*	*4*	*Expanded 3Rs Regulations*
5	*Wet/Dry*	*5*	*Expanded 3Rs Regulations with Organics*
6	*Mixed Waste Processing*	*6*	*Processing of All IC&I Waste*

The number of potential systems which could be developed from combinations of system components is very large. The systems which were developed were those considered to be reasonable for implementation in the GTA. There were no systems considered which were deemed impractical or unreasonable. In addition to the system combination possibilities, there is a wide menu of "enhancement" components which can be drawn upon to improve the performance of any given system.

The residential systems were developed specific to the four municipalities of the GTA whereas the IC&I 3Rs systems were applied to the GTA as a whole. This study did not attempt to develop an optimal system for each service area as that would require site-specific analysis and policy considerations beyond the scope of this study.

An evaluation, done at a non-site specific, generic level, identified the advantages and disadvantages to the environment of each potential 3Rs system. The evaluation was based on the following criteria groups:

- *Cost;*
- *Municipal Finance;*
- *Natural Environment;*
- *Service; and*
- *Social Environment.*

The systems were then ranked from lowest impact to highest impact by each criteria group.

Consultation

A public/agency consultation program is being undertaken as part of the GTA 3Rs Analysis. The consultation program is being conducted in three stages. The first stage occurred through June to December 1992 and involved MOEE Waste Reduction Office (WRO) staff attending the IWA information centre when the long list of candidate landfill sites was announced.

Stage 2 occurred from December 1992 to October 1993 and focused on the review of past consultation efforts dealing with waste management issues in the GTA. It also involved reviewing comments on 3Rs issues obtained through the IWA consultation activities.

Stage 3 is to occur in the Fall of 1993 and early 1994, and is centred on public/agency review of the draft GTA 3Rs documentation.

Conclusions

This document provides written estimates on the amount of waste that will not be generated due to waste reduction efforts and the amount of waste which will be diverted from disposal due to reuse or recycling efforts. It should be noted that the estimated diversion percentages are the cumulative diversion achieved over a 20-year period, from 1996 to 2015.

The disposal requirements for each service area depend on which residential and IC&I systems are combined to form any waste diversion system. The residential and IC&I 3Rs systems evaluated can be combined 25 different ways for each service area.

The estimates of waste diversion for the three service areas show that of the 25 combinations considered, 21 have the ability to divert 50% or more of the generated waste stream in the 20-year period between 1996 and 2015.

The analysis shows that the written estimates provided by the Minister of Environment and Energy to the IWA in May 1992 fall within the range of diversion achievable by a number of combinations of residential and IC&I systems within each of the service areas.

The systems presented and evaluated were not designed as plans for any of the Regions or service areas. They were chosen to estimate the impacts of a number of different possible approaches to waste diversion. They are not considered a complete list of all the possible combinations of components which could form waste diversion systems, and a comprehensive mix and match of components has not been attempted. The systems were chosen to provide a reasonable range of diversion options, and to estimate the impacts of these options.

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1.0 INTRODUCTION

1.1 Background

In 1989, the government of Ontario announced its commitment to meeting a Provincial target of at least 50% reduction of waste going to landfills and incineration by the year 2000. This target, a waste **diversion** target to be achieved through waste reduction, reuse and recycling (the 3Rs), was confirmed by the present government in 1990.

To facilitate the achievement of the 50% target, the Province introduced the *Waste Management Act*, 1992. The Act broadens the government's powers to reduce waste sent to disposal through a variety of means. It also vests powers in the Interim Waste Authority (IWA), an agency created to ease the waste disposal crisis in the Greater Toronto Area (GTA). The IWA is complying with its mandate by conducting environmental assessments to locate three long-term landfill sites in the GTA.

The GTA Regional Municipalities of Peel and Durham are each defined for the IWA process as separate "primary service areas". Metro Toronto and the Regional Municipality of York have been defined as a separate **combined** primary service area. Each of the three defined primary service areas are proposed to receive one new landfill facility identified through the IWA's process. The fifth GTA Regional Municipality, Halton, has already obtained approval for a landfill site and thus is not part of the present siting process. Figure 1.1 illustrates the municipal boundaries of the GTA.

1.2 Purpose of Study

This study has two purposes, each of which relates directly to a requirement created by the *Waste Management Act.*

The first requirement pertains to waste estimates. Section 14 of the *Waste Management Act* requires the Minister of Environment and Energy to provide a written estimate as to:

a) the amount of waste that would otherwise be expected to be generated in the primary service area (i.e. each of Peel, Durham and Metro/York) during a twenty-year period that will not be generated because of waste reduction efforts; and

GTA 3Rs ANALYSIS
MAP OF THE GREATER TORONTO AREA

FIGURE 1.1

> b) *the amount of waste that will be generated in the primary service area during a twenty-year period that will not need to be disposed of in the site because of the reuse or recycling of materials that are or could become waste.*

These waste estimates were provided to the IWA by Minister's letter dated May 15, 1992. A copy of this letter may be found in Appendix A. The current study provides additional analysis of 3Rs activities, in support of the waste diversion estimates previously provided.

The second requirement pertains to analysing the 3Rs as "alternatives to" landfill waste disposal sites. Section 15 of the *Waste Management Act* requires that the IWA environmental assessments contain a description of, and statement of rationale for the 3Rs, as well as evaluate matters relating to the 3Rs as an alternative to the landfill waste disposal sites. By administrative agreement, MOEE committed to provide such a rationale and evaluation to the IWA for use in its environmental assessments. The present report fulfils this requirement.

1.3 Study Approach

The GTA 3Rs Analysis identifies and assesses alternative 3Rs systems, comprised of combinations of 3Rs programs, technologies and practices, that could reasonably be implemented in the GTA. It is also determines the potential for each 3Rs system to divert waste over the twenty-year minimum life expectancy of the GTA landfill sites, and identifies the advantages and disadvantages of each system.

For purposes of the present analysis, an array of conceptually different 3Rs systems have been identified for addressing residential wastes, as well as for institutional, commercial, and industrial (IC&I) wastes. For each system, estimates of the amount of waste the system could potentially divert from disposal have been determined. An assessment, done on a non-site-specific, generic level and documented in this report, identifies the advantages and disadvantages to the environment of each potential 3Rs system, in keeping with the *Environmental Assessment Act*.

In conducting the 3Rs work, and providing estimates of waste that will not require disposal in the IWA established sites, MOEE is acting as a reliable authority in accordance with its legislative mandate, and not as the proponent or co-proponent of any of the 3Rs systems discussed. The alternatives presented in this report are not in any way

structured as detailed implementation plans for the Province, the Regions or the private sector.

1.4 Related Studies and Reports

This EA Input Document is supported by five technical appendices:

- Cost Technical Appendix;
- Municipal Finance Technical Appendix;
- Natural Environment Technical Appendix;
- Service Technical Appendix; and
- Social Environment Technical Appendix.

The Technical Appendices document in detail, the input of each of the disciplines (criteria groups) in the systems evaluation.

1.5 Outline of Report

The following outlines the main chapters of the GTA 3Rs Analysis.

Chapter 2.0, entitled Study Approach, presents an overview of the study process and discusses the goals and objectives of the study.

Chapter 3.0 outlines the activities and results of the consultation program to date. It also describes future consultative activities.

Chapter 4.0 describes each of the five regional municipalities in terms of socio-economic characteristics, natural environment, and municipal finance statistics.

Chapter 5.0 examines waste diversion within the GTA including a description of waste quantities and composition.

Chapter 6.0 discusses the available alternatives to waste disposal in the GTA both in terms of what is not available and what is potentially available.

Chapter 7.0 outlines how alternative 3Rs systems were developed and describes each alternative residential and IC&I 3Rs system.

Chapter 8.0 presents the net effects analysis undertaken for each of the 3Rs systems.

Chapter 9.0 concludes the report by summarizing the results of the study.

2.0 STUDY APPROACH

The GTA 3Rs Analysis project was co-ordinated by the MOEE through the Fiscal Planning and Information Management Branch. Technical work was undertaken by four separate consulting firms who were contracted for the work. These contractors are referred to as the "study team" within this document.

The decision-making process for this study occurred systematically through a number of logical steps using an increasing level of detail.

Each key stage of this study led to a specific decision point or points. These stages, however, did not always progress in a simple sequential fashion. Rather, they were constantly reviewed, and in some cases, revised in light of new information as it became available. This iterative process ensured that the decisions which were made, were reviewed and their implications recognized.

The framework for decision making was based on a number of goals and objectives which are discussed below.

2.1 Definition of Goals

Goals represent the ends towards which an environmental assessment process (EA process) is directed serving as broad statements of what is to be accomplished.

This report identifies a range of reasonable 3Rs systems. To evaluate each system, and thereby evaluate 3Rs as an alternative to a landfill waste disposal site (Section 15(1), WMA), a set of goals were used. These are:

- **To minimize risk to human health and safety;**
- **To minimize negative environmental (as defined in the EA Act) impacts and enhance natural and human communities;**
- **To maximize service and diversion rates; and**
- **To minimize cost.**

The rationales for these goals are as follows:

- Minimizing risk and negative environmental impacts, and enhancing natural and human communities reflect adherence to the requirements and spirit of the *EA Act* for the protection, conservation and wise management of the environment.

- The service and diversion goal relates to the ability of an alternative to meet waste diversion goals in an effective and socially acceptable manner.

- The goal of minimizing cost to the public and private sector relates to the provision of an alternative by one or both of the sectors in a cost effective manner.

The goals were used to group criteria and indicators throughout all steps of the evaluation. They also provided the framework for the definition of criteria for the evaluations. Criteria were selected to measure the achievement of goals and objectives. Data and results for each goal were considered separately and then trade-offs were considered among goals.

2.2 Study Process

The *Waste Management Act*, 1992, identifies the 3Rs as an alternative to the landfill waste disposal site in each primary service area (Section 15(1), WMA). It requires among other things, a description of and an evaluation of reduction in the amount of waste, and recycling or reuse of materials.

However, an evaluation of "3Rs" as a single waste management practice would not be very informative since a wide range of effects could arise, depending on the particular approach to 3Rs a jurisdiction might take. To avoid such broad generalization, this study examines a range of reasonable approaches to waste management which all fall under the general 3Rs label, thereby enriching the understanding of the type and extent of effects which might be experienced if a particular approach to 3Rs was followed. In this report, this range of reasonable approaches to 3Rs are termed 3Rs system alternatives.

The study process selected was one modelled on the intent and requirements of the *EA Act*. Specifically, the study process:

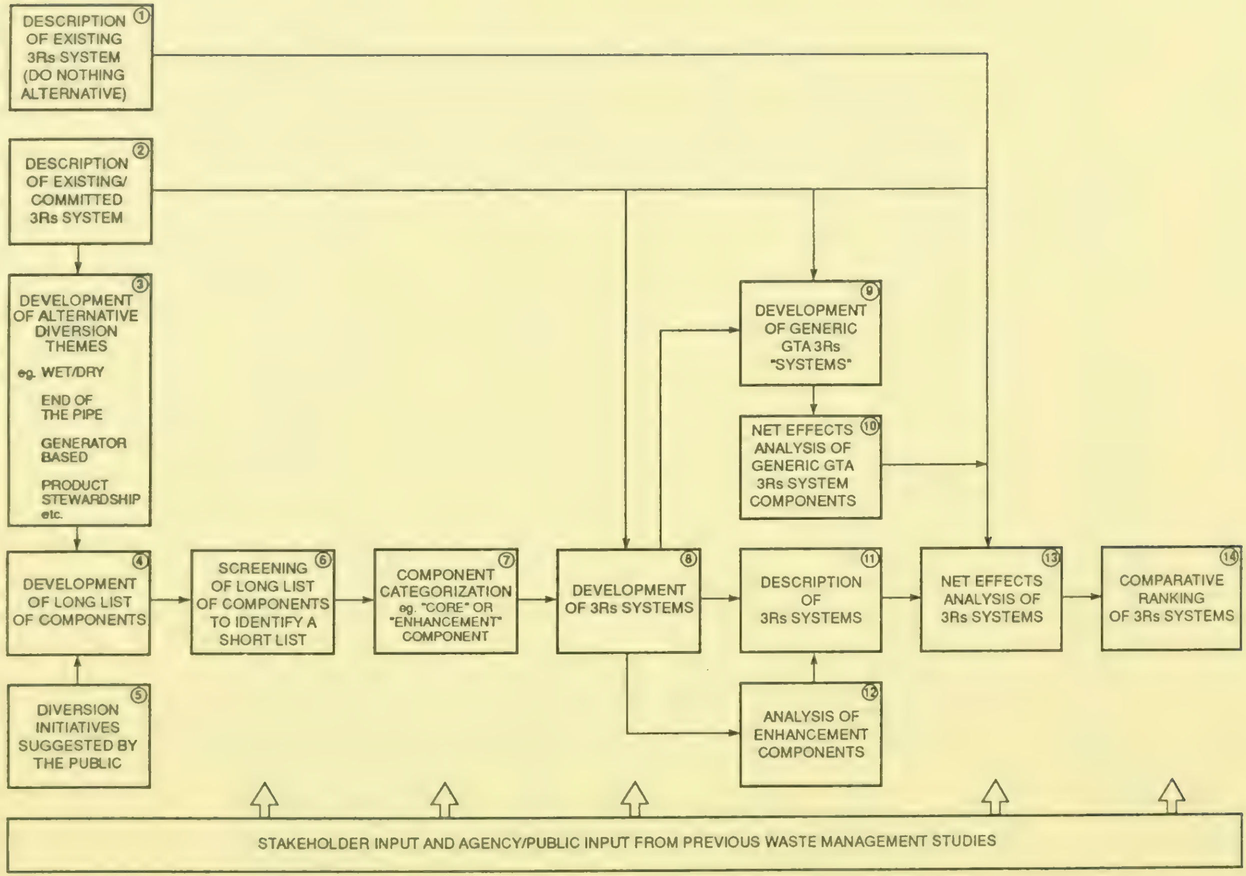
- considered a reasonable range of alternatives;
- considered the full definition of the environment;
- systematically evaluated the net environmental effects of the options being considered; and
- considered public views on waste diversion.

Figure 2.1 presents the study process. This study process was applied to the regional municipalities within the "primary service area" (Metro Toronto and the Regions of Durham, York and Peel). For the Region of Halton, only the Existing and Existing/Committed 3Rs systems were described. Halton has already obtained approval for a landfill site and thus, is not part of the site search process. IC&I has included Halton as these activities transcend municipal boundaries. The following briefly discusses the main study activities and key decision points.

2.2.1 Study Process Overview

Key to the designing of alternative systems was the recognition of the Existing 3Rs system within each of the Regional Municipalities (Step 1). The Existing system or "do nothing" alternative was identified as the 3Rs system in place within each Regional Municipality as of December 31, 1992. The Existing system was described for both the residential/municipal sector for each Regional Municipality, and for the IC&I sector at the GTA level.

Using the Existing system as a base, the next step (Step 2) was to identify Regional, Municipal, Provincial and Federal, five year 3Rs commitments. Once identified, these 3Rs commitments were then translated into components and added to the Existing system to form the Existing/Committed system (January 1, 1993 to December 31, 1997). Chapter 5.0 provides a detailed description of both the Existing and Existing/Committed systems for each Regional Municipality and the IC&I sector for the GTA.



GTA 3Rs SYSTEM DEVELOPMENT AND EVALUATION APPROACH

FIGURE 2.1

The alternative diversion themes were then developed by the study team (Step 3). These represented the conceptual waste diversion options which are/can be expected to be available. Diversion themes represent the basis of potential alternative systems such as: wet/dry system, product stewardship, etc. They represent functionally different methods for achieving diversion. The diversion themes identified by the study team were then used to develop a long list of waste diversion components which served as the building blocks for the system development (Step 4). Included in this long list were components suggested by the public and identified by the study team from existing reports and past public consultations (Step 5). Chapter 3.0 discusses in greater detail how public suggestions and comments were identified and incorporated.

The long list of components were then screened (Step 6) using three criteria.

To pass the screen and proceed to the next step in the evaluation, each component was judged to:

- represent a proven technology, technique or program;
- satisfy government standards and regulations; and
- divert a reasonable quantity of waste from disposal.

Section 7.6 defines these screening criteria in more detail.

Step 6 screening identified a short list of alternative 3Rs system components.

The short listed components were then categorized as either core or enhancement components (Step 7) (Figure 2.1). Core components (e.g. Enhanced Blue Box) served as the focus for alternative system development. Enhancement components could be added to systems to enhnace system performance and increase waste diversion. Enhancement components were further divided into primary and secondary enhancement component categories. Primary enhancement components (e.g. promotion and education) are proven to add an important element that would contribute to the function of a waste diversion system. Secondary enhancement components could be added to systems to increase waste diversion, but were not considered critical to their function. Only core and primary enhancement components were included in alternative waste diversion systems developed for analysis in the GTA.

Based on the categorized components, alternative systems were then developed (Step 8) and then described (Step 11).

The next step was to determine the net effects of each system on the basis of the Cost, Municipal Finance, Natural Environment, Service and Social Environment Criteria Groups. Recognizing the amount of overlap between the Regional systems, a net effects analysis at a GTA level was first done on all the components found within each of the systems developed for each of the Regional Municipalities (Steps 9 and 10). The components and their net effects were then recombined into the Regionally based 3Rs systems to create the Net Effects Analysis for each individual system for each Region (Step 13). Chapter 8.0 discusses, in greater detail, the approach taken to develop the net effects.

Based on the net effects, the final step of the study process was the ranking of each alternative system within each criterion group (Step 14).

2.2.2 Assumptions Overview

A number of key study assumptions were followed through the GTA 3Rs Analysis Study. These assumptions are detailed within the text of this report in the appropriate sections. Assumptions specific to the individual disciplines/criteria groups are discussed in the Technical Appendices.

Assumptions which were of relevance to the overall study pertain to the study area, study time frame, and MOEE's role in this process are outlined below:

- The study area for the GTA 3Rs Analysis is the area encompassing Metro Toronto and the Regional Municipalities of Durham, York, Peel and Halton. Metro Toronto/York Region, Durham Region and Peel Region are defined as the "primary service area". The Region of Halton has been included as part of the study area as it is part of the GTA. It is not, however, part of the "primary service area". Thus, alternative systems have not been developed and evaluated for Halton Region.

- The *Waste Management Act*, 1992 specifies that the IWA landfills are to operate for a minimum of 20 years. Based on a system implementation date of 1996 which is the assumed start-up date for the IWA landfills, the planning time frame for this study extends to the year 2015.

- The MOEE is <u>not</u> the proponent or co-proponent in any aspect of this study. The study provides additional analysis of 3Rs activities and supplemental data on waste diversion estimates for use by the IWA.

Implementation of any of the 3Rs systems is at the discretion of the Regional Municipalities in the GTA and the IC&I sector.

- Markets for secondary materials produced from 3Rs activities are assumed to be available.

- The export of waste for waste disposal purposes is being treated as disposal for the purpose of this study.

- The *Waste Management Act*, 1992, for the purpose of the IWA's landfills, restricts alternatives to the undertaking to be considered to the 3Rs, and the use of other single landfill sites in the primary service areas. Incineration and the transportation of waste out of the primary service areas are not to be considered.

3.0 CONSULTATION ON GTA 3RS ANALYSIS

The purpose of the consultation program for the GTA 3Rs Analysis is to identify and consider the views and suggestions of relevant stakeholders. Stakeholders includes both members of the public and government agencies. Consultation is occurring over three stages. The first stage was conducted in 1992 in conjunction with the IWA. The second stage occurred from February to July 1993 while the main work on the GTA 3Rs Analysis was being conducted. The third stage is to occur with the announcement of the preferred IWA landfill sites and will focus on the Draft GTA 3Rs Analysis EA Input Document. This consultation will provide stakeholders an opportunity to comment on methods and assumptions being used to estimate the amount of GTA waste likely to be diverted through 3Rs programs, that would otherwise have to be landfilled.

3.1 Consultation Program (Stage 1)

The consultation program conducted for the GTA 3Rs analysis project commenced on June 4, 1992, at the same time the IWA announced its Long List of Candidate Landfill Sites. At this time, the consultation focus was on the GTA waste diversion estimates provided by the Minister to the IWA on May 15, 1992. A summary report, "Public Consultation on Waste Diversion Estimates Provided to the Interim Waste Authority", prepared by the Waste Reduction Office, and documenting this 1992 program, appears in Appendix B.

The dates and locations of the eight IWA Information Centres (IC) in the three Primary Service Areas attended by Ministry staff/representatives to discuss waste diversion estimates were as follows:

Date (1992)	Location of IC
June 4, 5, 6 and 8	Pickering
June 4, 5 and 8	Bowmanville
June 4, 5, 8 and 9	Port Perry
June 4, 6, 8 and 11	Bolton
June 4, 6, 8, 13 and July 9	Snelgrove
June 4, 6, 8 and 11	King City
June 4, 6 and 8	Stouffville
June 4, 6 and 8	Sutton

At the above-noted ICs, information on MOEE's role in achieving the Province's waste diversion targets (at least 50% by 2000) was provided. Materials distributed are contained in Appendix B.

At three of the ICs (Sutton, Stouffville, and Snelgrove), sessions were held by MOEE staff to discuss waste diversion. These sessions were attended by people expressing an interest on sign-up sheets posed at each of the eight ICs, and who were later telephoned and invited. Twenty-four people participated.

Overall, response at the open houses signalled that an aggressive diversion approach was desired by those who attended in order to make landfilling less necessary. In York Region, IC attendees strongly expressed their opposition to the size of the proposed site, not because of the calculations used, but because the facilities would also be used for Metro Toronto's garbage. Concerns were raised at each meeting about the financial commitment involved in siting landfills, the latter being perceived as much greater than the commitment to 3Rs.

Some individuals were uneasy that diversion initiatives put in place by the government would not be sustained over time. This could leave industries that had changed their operations to conform to diversion initiatives in trouble, and communities hosting landfills would be forced to accept materials (and potentially greater volumes) for which the sites had not been designed. Some participants felt that the Provincial Government should force communities (and individuals) to recycle and reduce, through user pay systems, mandatory source separation and stiffer penalties.

As part of this consultation program, representatives of the Ministry also met with Regional Consultation Networks (RCN) (multi-stakeholder committees representing various interests in each Primary Service Area which have met throughout the IWA process).

3.2 Review of Waste Management Initiatives and Related Consultation Programs (Stage 2)

The GTA 3Rs Analysis study team also examined past (GTA and Provincial) waste management initiatives and the results of the consultation conducted for these. Materials from the following studies were reviewed:

- **Solid Waste Environmental Assessment Project** (SWEAP) Metro Toronto;

- **Solid Waste Interim Steering Committee** (SWISC) approach to landfill siting and waste management;

- **Waste Reduction Office** Waste Management Initiatives Papers; and

- **IWA Landfill Site Search** Public Consultation Documentation.

Full references of documents consulted appear in Appendix C. It should be noted that a number of social surveys were also conducted as part of these studies. This information was considered by the Social Environment discipline in the GTA 3Rs system evaluation as documented in the Social Environment Technical Appendix.

As outlined, the results of the IWA's consultations were reviewed with particular notice paid to comments made on 3Rs within the GTA. Information collected was reviewed and considered at various stages of the project. As most of the comments identified were suggested 3Rs initiatives which should be considered, public comments were primarily used in developing the long list of 3Rs components and subsequent system development.

A summary of the extensive comments made on these studies is found in Appendix C.

The following briefly discusses and summarizes these comments. It should be noted that as the frequency of comments was not available, it was therefore not possible to identify trends and gain a sense as to which issues were of most importance. All comments were, therefore, considered to be of equal importance. The comments/issues were organized by the following subject areas:

- alternate diversion initiatives;
- advantages/disadvantages of diversion strategies; and
- general comments.

Alternative Diversion Initiatives

The following summarizes the diversion initiatives which were suggested by the public. The initiatives are listed rather than discussed as they served as input into the development of the long list of components. Most of the initiatives which were suggested were either infrastructure related or forms of legislation/regulation.

Education

- education programs for school children;
- educate public on 3Rs.

Economic

- User Pay system for garbage generated at residences;
- tax industries creating excess garbage and packaging;
- eliminate economic subsidies to industry;
- deposits on all beverage containers;
- reward developers and producers of biologically acceptable products;
- charge a tax on garbage generation; and
- tax individuals for not participating in 3Rs.

Infrastructure

- large central Materials Recovery Facility (MRF);
- municipally based composting;
- borrow recycling technology from Japan;
- Eco Farms Waste Management System;
- use sophisticated sorting facilities which feed gasification plants for energy production;
- anaerobic digesters;
- hand sort waste to make sure recyclables are removed;
- use ESDEX Recycling Corp;
- waste reproduction facilities specializing in individual waste streams;
- look at Wet/Dry sorts;
- composting programs for leaf and yard waste, and food waste;
- buy restaurant composters from ECO Corp;
- provide neighbourhood leaf shredders in Fall; and
- need separate recycling bins outside shopping malls.

Legislation/Regulation

- pass legislation against over-packaging;
- allow scavenging at landfill sites;
- mandate source separation;
- product stewardship;
- reduction of packaging;

- laws that prevent consumers from waste generating;
- styrofoam and similar products should be banned;
- government should force manufacturers to produce recyclable/reusable products;
- companies should be taking their containers back;
- mandatory reuse standards for consumer goods;
- emulate "Green Dot Law" in Germany;
- advertising should be restricted to the air waves; and
- legislation to prevent sale of non-recyclable materials.

Other

- serious reduction and intensive recycling similar to North Hampstead, New York or Camden County, New Jersey;
- reuse and recycle items in old landfill sites;
- more recycling and reusing at manufacturer's level;
- have they ever considered putting leaf compost in farm fields; and
- more effort into building markets for recycled products and materials.

Advantages and Disadvantages of Diversion Initiatives

Comments regarding the advantages and disadvantages of diversion initiatives reflected concerns, problems and preferences raised by the public. A number of comments indicated a general concern as to how municipalities would fund diversion initiatives. The comments also indicated that the public may not be willing to pay more taxes to pay for these initiatives.

A number of comments were also made with regard to the problems of home composting such as difficulties for the elderly/disabled, the possible attraction of vermin, and non-availability of composting to multi-unit buildings. Comments were also made indicating a preference for wet collection over home composting.

General Comments

Based on the comments reviewed, a general sense was gained that the public perceives that not enough is being done with respect to the 3Rs. Those who commented indicated that 3Rs programs should be mandatory, that present diversion targets are too conservative, and that the approval process should be reviewed so that it does not work

against the development of recycling facilities. The comments also suggest that the public is supportive of initiatives that would encourage recycling including the development of markets for secondary materials.

3.3 Data Verification Activities (Stage 2)

Data verification activities were undertaken by each of the criteria groups/disciplines to both confirm and support their data which served as input into the analysis. The following summarizes these activities. The activities are discussed in more detail within the Technical Appendices.

Cost

Data verification activities for the Cost discipline consisted of contacting individuals and organizations to review information that had been provided to the study team and to verify subsequent interpretations and analysis. To verify information provided for both the Residential and IC&I sectors, telephone and personal interviews were held with representatives of the five Regions (including Works Department staff); operators of waste diversion facilities and GTA IC&I generators, haulers and recyclers.

Representatives of most of the lower-tier municipalities of the five GTA Regions were telephoned to complete and verify information where necessary about costs of waste diversion activities.

Municipal Finance

To verify and further augment the Municipal Archive Retrieval System (MARS) data base used by the Municipal Finance discipline, personal interviews with relevant financial and waste management staff in each of the GTA municipalities were conducted.

Natural Environment

The main data verification activity undertaken by the Natural Environment discipline were telephone contacts with the operators of selected 3Rs system components. These contacts were used to verify documented effects of 3Rs components on the natural environment.

Service

Data verification activities for the Service discipline consisted of contacting individuals and organizations to review information that had been provided and to verify subsequent interpretations and analysis. To verify information provided for both the Residential and IC&I sectors, telephone and/or personal interviews were held with key representatives of Works Departments of each of the five GTA Regions; representatives from secondary markets industries; relevant pilot projects; Municipal Recycling Facilities; private sector haulers and material processors; private waste handling facilities; and IWA landfill search consultants.

Of key relevance to this aspect of the project were meetings held between RIS and staff from Regional waste reduction departments to verify waste generation and diversion data provided.

Social Environment

Data verification for the Social Environment research consisted mainly of verifying the primary and secondary data collected by providing summaries of the data collected to the appropriate municipal, company, institution and association representative for review and comment.

Some key activities included: interviews with representatives of Regional Municipalities, with operators of 3Rs facilities (public and private) and selected institutional, commercial and industrial association representatives to obtain additional data and verify results of prior primary and secondary data collection. For the regional municipal and facility operator interviews, the completed interview form was provided to the interviewee for review before being finalized. Demographic, Housing and Employment data was also verified by providing the completed statistical data and projections to those responsible for the data in Metro Toronto, each of the GTA Regional Municipalities and the office of the GTA.

Information collected by the MOEE on registered complaints or non-compliance with operating conditions of any 3Rs components was reviewed to verify the potential social effects identified from the research.

3.4 Peer Review (Stage 3)

Early in the 3Rs project, the study team identified the need for an objective outside peer review of the GTA 3Rs analysis. Three waste diversion experts have been asked to verify that a reasonable range of diversion alternatives are being considered by MOEE, and that the approach taken to develop these alternatives is sound.

3.5 Future Consultation Activities (Stage 3)

In the Fall of 1993 and early 1994, the study team will undertake further consultation on the EA Input document, in co-ordination with the IWA. Activities are planned to inform the public, municipalities and government agencies of the results of the GTA 3Rs analysis and to request their comments on the methods, assumptions and information used in the analysis, as well as the study results. Activities planned for the Fall of 1993 include preparation of an article for the IWA's *Landfill News* on 3Rs, preparation and distribution of documentation including summary reports and fact sheets on 3Rs, participation at IWA Information Centres, meetings with groups and the holding of public seminars on 3Rs as required, and other activities.

Based on input received from all of the above consultation activities, data will be updated and the final draft EA Input Document revised for formal submission to the IWA.

4.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

This chapter describes the Existing environment for the Regional municipalities of Durham, York and Peel and Metro Toronto in terms of the following subject areas: municipal finance, social environment and natural environment. These descriptions provide the context for the study.

4.1 Municipal Finance

The financial profile developed for each of the Regional Municipalities was based on the 1990 MARS database as it is the most recent available verified year. Prior to finalization of this document, the base data will be updated to reflect the most recent information possible.

4.1.1 Durham Region (Municipal Finance)

Table 4.1 summarizes the financial profile for Durham Region and its constituent area municipalities. A complete financial profile is presented in the Municipal Finance Technical Appendix.

4.1.1.1 Property Assessment, Tax and Other Revenue

Total revenues; including property tax, grants, program fees and other revenues for Durham were $518 million in 1990.

On average, residential assessment in Durham Region in 1990 make up 74% of the total tax base, with the commercial/industrial sector representing the remaining 26%. This residential/commercial split, however, varied considerably among local municipalities. On the one hand, the City of Oshawa maintained a commercial/industrial sector that represented 41% of the tax base. Ajax, Pickering and Whitby maintained commercial/ industrial ratios between 20 and 25%. In the smaller municipalities, however, the commercial/industrial sectors ranged between 10% and 15% of the tax base.

TABLE 4.1

DURHAM REGION FINANCIAL PROFILE

REGION OF DURHAM	RMD	Oshawa	Ajax	Newcastle	Pickering	Whitby	Brock	Scugog	Uxbridge	TOTAL
HOUSEHOLDS	136,322	47,720	17,135	15,982	20,128	19,266	4,468	6,700	4,923	136,322
ASSESSMENT & TAX										
Residential Portion Percentage	74.2	58.9	79.6	85.1	79.6	75.6	88.2	89.3	87.2	74.2
Commercial/Other Portion Percentage	25.8	41.1	20.4	14.9	20.4	24.4	11.8	10.7	12.8	25.8
Tax Levy										
Average Residential Share of Tax Levy $ per Household										
– Local	481.03									
– Regional	341.12									
– School Board	961.25									
– Direct Charges	210.00									
Total Tax Levy	1,993.40									
REVENUE DISTRIBUTION										
Property Tax %	39.3	62.0	63.8	53.3	42.3	57.1	59.8	58.9	53.3	46.0
Grants %	29.2	15.6	9.3	18.3	26.8	15.2	22.5	22.3	18.1	24.7
Program & Other %	23.4	7.3	15.6	18.6	17.5	15.1	7.7	9.2	15.4	19.3
Fees & Service Charges %	8.1	15.2	11.3	9.8	13.4	12.6	10.1	9.6	13.1	10.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Average NonTax Revenue/Household	1,436.12	606.62	480.71	579.21	927.22	618.03	414.28	361.34	577.09	2,053.23
OPERATING EXPENDITURES										
Operating Expenditures ($000)	277,513	77,259	22,425	20,628	32,621	28,367	4,835	5,986	6,082	475,716
Per Household $ Cost	2,035.72	1,619.01	1,308.72	1,290.70	1,620.68	1,472.39	1,082.14	893.43	1,235.43	3,489.65
Solid Waste Management ($000)	22,690	1,884	729	1,701	649	1,178	121	341	192	29,485
Per Household $ Cost	166.44	39.48	42.54	106.43	32.24	61.14	27.08	50.90	39.00	216.29
*Net Waste Diversion Budget ($000)	5,051									5,051
Per Household $ Cost	37.05									37.05
% Waste Diversion to Operating Costs	1.8									1.1
DEBT										
Debt Outstanding ($000)	21,840	5,683	691	5,590	979	408	51	0	51	35,293
Per Household $ Cost	160.21	119.09	40.33	349.77	48.64	21.18	11.41	0.00	10.36	258.89
Debt Charges ($000)	7,634	1,302	222	988	392	119	131	63	33	10,884
Per Household $ Cost	56.00	27.28	12.96	61.82	19.48	6.18	29.32	9.40	6.70	79.84
RESERVES/RESERVE FUNDS										
Reserves/Reserve Funds ($000)	101,633	35,766	10,262	14,327	13,409	18,471	1,820	1,705	1,909	199,302
Per Household $ Cost	745.54	749.50	598.89	896.45	666.19	958.74	407.34	254.48	387.77	1,461.99

SOURCE: Ministry of Municipal Affairs – MARS FIR's 1990 *Future Urban Research Budget Analysis

On average, residential property taxes in Durham Region approached $1,993 per household in 1990. This consisted of $481 for local purposes; $341 per household for the Regional levy; $210 in direct water charges; and, $960 for school purposes. In 1990, the school portion of property taxes approached 48%, with the Regional levy approaching 17% and the local levy being 24%. While property taxes for Regional and local purposes totalled $189 million in 1990, 65% ($124 million) was derived from the residential sector with 35% ($65 million) paid by the commercial/industrial sector.

In total in 1990, property taxes represented 46% of all of the municipalities' revenue sources. Provincial and Federal grants totalled $117 million in 1990 and this represented 25% of total revenue. Similarly, program revenue (user charges, water revenues, recreation fees, etc.) totalled $100 million in 1990 and this represented 19% of total revenue. On average, non-tax revenues approached $2,053 per household in Durham Region in 1990.

4.1.1.2 Operating Expenditures

In total, operating expenditures in the Durham area (Region and area municipalities) approached $476 million in 1990. The Region itself accounted for $278 million, or 58% of total. Regional expenditures primarily related to Social Services - $102.4 million; Waterworks and Sanitary Sewage - $70.9 million; and, Police - $44.9 million. Local expenditures, on the other hand, primarily related to Road Maintenance and Repair - $61.8 million; Recreation - $48.0 million; and Fire Protection - $33.8 million.

Waste Management costs in Durham Region (Region and area municipalities) totalled $29.5 million in 1990. When the 1992 budget figures of $5.0 million for waste diversion are compared, it can be shown that waste diversion represented 17% of the Region's 1990 waste management budget. Similarly, waste diversion represented 1.1% of the Region's 1990 operating expenditures of $476 million. The reason for comparing 1990 waste management costs to 1992 waste diversion costs was that 1990 was the last available verified year of the MARS database whereas it was felt by the study team that 1992 diversion activities (and costs) are more recent and a truer reflection of the level of diversion which is occurring. Comparing the two different years was considered by the study team to be valid for describing operating expenditures. This comparison was undertaken for all Regions.

When expressed on a per household basis Regional expenditures approach $2,035 and local expenditures average $1,455 per household. In total, municipal operating costs exceed $3,490 per household. Per household cost figures for waste diversion shown on Table 4.1 are net of grants, material sales and other funding.

4.1.1.3 Capital Expenditures and Reserves

In 1990, capital expenditures for the Durham area (Region and area municipalities) approached $137 million and this consisted mainly of Road Maintenance and Repair - $59.1 million; Water and sewer - $24.7 million; Recreation - $29.7 million; General Government - $7.3 million and Police and Fire Protection - $6.3 million. These capital expenditures were funded from: reserves and reserve funds - 39%; general tax revenue 38%; Provincial Grants - 14%; and, debenture borrowing - 5%.

Total outstanding debt in the Durham area in 1990 approached $35.3 million, of which $21.8 million was held by the Region. This represented an average of $259 per household when both the Region and area municipalities are combined. To pay this debt, debt charges in the Durham area total $10.9 million per year and this represented about $80 per household. When expressed as percentage of expenditures, which is recommended by the Ministry of Municipal Affairs debt capacity guideline, debt charges for the entire Regional area in 1990 represented 2.3% (see Municipal Finance Technical Appendix for full reference).

In 1990, reserve funds totalled $199.3 million for both the Region and the area municipalities. The Region itself maintained $101.6 million in reserves and reserve funds while the area municipalities maintained $97.7 million. When combined, these funds represented a 42% coverage of annual operating expenditures and, in total, these funds approach $1,460 per household.

4.1.2 Metro Toronto (Municipal Finance)

Table 4.2 summarizes the financial profile for Metro Toronto and its constituent area municipalities. In 1990, Metro Toronto maintained a population of 2,133,559 with a total number of households approaching 884,421, thus yielding a persons per household average of 2.4. The City of Toronto, North York and Scarborough are the largest municipalities in Metro Toronto with populations of 597,100, 544,500 and 470,406, respectively. The other Metro Toronto municipalities, Etobicoke, York and East York had populations of 293,400, 131,500 and 96,500, respectively in 1990.

TABLE 4.2

METRO TORONTO FINANCIAL PROFILE

METRO TORONTO & REGION	Metro	Toronto	Etobocoke	Scarborough	North York	York	East York	TOTAL
HOUSEHOLDS	884,421	286,218	116,467	174,530	205,989	56,266	44,351	884,421
ASSESSMENT & TAX								
Residential Portion Percentage	53.1	42.1	53.8	62.2	59.2	73.3	72.8	53.1
Commercial/Other Portion Percentage	46.9	57.9	46.2	37.8	40.8	26.7	27.2	46.9
Tax Levy								
Average Residential Share of Tax Levy $ per Household								
– Local	246.04							
– Regional	620.73							
– Direct Charges	149.00							
– School Board	1,151.70							
Total Tax Levy	2,167.47							
REVENUE DISTRIBUTION								
Property Tax %	37.4	49.5	49.0	50.3	48.4	54.9	55.2	41.9
Grants %	28.9	17.7	14.4	16.9	13.6	15.9	14.8	24.2
Program & Other %	8.8	23.9	29.8	29.0	30.0	25.4	27.0	15.4
Fees & Service Charges %	24.8	8.9	6.8	3.7	8.0	3.7	3.1	18.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Non-Tax Revenue ($000)	1,907,926	369,117	110,252	140,291	196,282	35,887	26,953	2,786,708
Average NonTax Revenue/Household	2,157.26	1,289.64	946.64	803.82	952.88	637.81	599.61	3,150.88
OPERATING EXPENDITURES								
Operating Expenditures ($000)	3,075,181	637,011	167,842	227,809	301,609	66,242	48,313	4,524,007
Per Household $ Cost	3,477.06	2,225.61	1,441.11	1,305.27	1,464.20	1,177.30	1,074.79	5,115.22
Solid Waste Management ($000)	196,195	31,074	8,615	9,747	18,849	3,573	2,883	270,936
Per Household $ Cost	221.83	108.57	73.97	55.85	91.50	63.50	64.14	306.34
*Net Waste Diversion Budget ($000)	20,280	8,432	1,789	8,151	3,329	717	1,536	44,234
Per Household $ Cost	22.93	29.46	15.36	46.70	16.16	12.74	34.17	50.01
% Waste Diversion to Operating Costs	0.7	1.3	1.1	3.6	1.1	1.1	3.2	1.0
DEBT								
Debt Outstanding ($000)	430,464	133,954	43,205	13,840	36,274	15,940	23,341	697,018
Per Household $ Cost	486.72	468.01	370.96	79.30	176.10	283.30	519.25	788.11
Debt Charges ($000)	127,175	32,533	9,419	5,450	9,597	4,520	4,441	193,135
Per Household $ Cost	143.79	113.67	80.87	31.23	46.59	80.33	98.80	218.37
RESERVES/RESERVE FUNDS								
Reserves/Reserve Funds ($000)	394,673	298,158	50,681	113,321	106,627	12,384	10,710	986,554
Per Household $ Cost	446.25	1,041.72	435.15	649.29	517.63	220.10	238.26	1,115.48

SOURCE: Ministry of Municipal Affairs – MARS FIR,s 1990 *Future Urban Research Budget Analysis

4.1.2.1 Property Assessment, Tax and Other Revenue

Total revenues; including property tax, grants, program fees and other revenues for Metro Toronto were $4.8 billion in 1990.

On average, residential assessment in the Metro Toronto Region in 1990 approached 53% of the total tax base, with the commercial/industrial sector representing the remaining 47%. This residential/commercial split is relatively consistent throughout Metro Toronto except for the smaller municipalities. The City of Toronto maintained the highest commercial ratio in 1990 at 57.9%, while Etobicoke, Scarborough, and North York ranged between commercial ratios of 38 to 46%. At the same time, York and East York maintained a commercial/industrial sector that represented 27% of the tax base.

On average, residential property taxes in Metro Toronto approached $2,167 per household in 1990. This consisted of $246 for local purposes; $620 per household for the Regional levy; $149 for direct charges; and, $1,152 for school purposes. In 1990, the school portion of property taxes approached 53%, with the Regional levy approaching 27% with the local levy being 11%. While property taxes for Regional and local purposes totalled $1.7 billion in 1990, 46% ($804.3 million) was derived from the residential sector with 54% ($922.7 million) paid by the commercial/industrial sector.

In total in 1990, property taxes represented 42% of all of the municipalities revenue sources. Provincial and Federal grants totalled $1.0 billion in 1990 and this represented 24% of total revenue. Similarly, program revenue (user charges, water revenues, recreation fees, etc.) totalled $740.3 million in 1990 and this represented 15% of total revenue. On average, non-tax revenues approached $3,150 per household in Metro Toronto Region in 1990.

4.1.2.2 Operating Expenditures

In total, operating expenditures in Metro Toronto approached $4.5 billion in 1990. Metro Toronto itself accounted for $3.1 billion, with the area municipalities totalling $1.4 billion. Metro Toronto expenditures primarily related to Social Services - $924.5 million; Transportation - $867.9 million (including the TTC); Police - $523.9 million; and, Waterworks and Sanitary Sewage - $194.2 million. Local expenditures, on the other hand, primarily related to Recreation - $330.7 million; General Government - $294.0 million; Fire Protection - $262.1 million; and Road Maintenance and Repair - $222.7 million.

Waste Management costs in Metro Toronto (Region and area municipalities) totalled $270.9 million in 1990. When the 1992 budget figures of $44.2 million for waste diversion are compared, it can be shown that waste diversion represented 16% of Metro Toronto's 1990 waste management budget. Similarly, waste diversion represented 1.0% of the total area's 1990 operating expenditures of $4.5 billion.

When expressed on a per household basis, Metro Toronto's expenditures approach $3,480 and local expenditures average $1,670 per household. In total, municipal operating costs exceed $5,115 per household. Per household cost figures for diversion shown on Table 4.2 are net of grants, material sales and other funding.

4.1.2.3 Capital Expenditures and Reserves

In 1990, capital expenditures for the Metro Toronto area (Region and area municipalities) approached $796 million and this consisted mainly of Transportation and Road Maintenance - $271.4 million; Water and sewer - $126.6 million; General Government - $86.5 million; Recreation - $70.2 million; and, Waste Management - $59.1 million. These capital expenditures were funded from: general tax revenue 26%; reserves and reserve funds - 25%; Provincial Grants - 23%; and, debenture borrowing - 11%.

Total outstanding debt in the Metro Toronto area in 1990 approached $697 million, of which $430.5 million was held by Metro Toronto. This represented an average of $790 per household when both the Metro Toronto and area municipalities are combined. To pay this debt, debt charges in the Metro Toronto area total $193.1 million in 1990 and this represented about $218 per household. When expressed as a percentage of expenditures, which is recommended by the Ministry of Municipal Affairs debt capacity guideline, debt charges for the entire Regional area in 1990 represented 4.3%.

In 1990, reserve funds totalled 986.6 million for both the Metro Toronto and the area municipalities. Metro Toronto itself maintained $394.7 million in reserves and reserve funds while the area municipalities maintained $592 million. When combined, these funds represented a 21% coverage of annual operating expenditures and, in total, these funds approach $1,115 per household.

4.1.3 <u>York Region (Municipal Finance)</u>

Table 4.3 summarizes the financial profile for York Region and its constituent municipalities.

TABLE 4.3

YORK REGION FINANCIAL PROFILE

REGION OF YORK	RMY	Aurora	Markham	Newmarket	Richmond Hill	Vaughan	Whitchurch Stouffville	East Guillimbury	Georgina	King	TOTAL
HOUSEHOLDS	149,036	9,081	42,930	13,121	24,380	29,194	6,228	5,629	12,537	5,936	149,036
ASSESSMENT & TAX											
Residential Portion Percentage	73.5	76.5	71.7	76.1	77.7	63.6	83.7	91.7	89.5	92.3	73.5
Commercial/Other Portion %	26.5	23.5	28.3	23.9	22.3	36.4	16.3	8.3	10.5	7.7	26.5
Tax Levy											
Average Residential Share of Tax Levy $ per Household											
– Local	313.55										
– Regional	518.89										
– Direct Charges	208.00										
– School Board	1,917.20										
Total Tax Levy	2,957.64										
REVENUE DISTRIBUTION											
Property Tax %	62.9	57.5	44.8	40.1	45.0	44.6	51.9	51.5	54.1	48.9	52.0
Grants %	33.8	9.9	9.2	9.4	8.0	7.3	11.8	16.6	15.3	17.1	18.1
Program & Other %	0.2	19.9	29.9	35.0	40.6	33.9	25.3	22.9	24.1	20.6	20.7
Fees & Service Charges &	3.1	12.7	16.1	15.4	6.4	14.2	11.1	9.0	6.5	13.4	9.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	1[illegible]
Non-Tax Revenue ($000)	64,907	6,475	44,746	16,083	33,951	47,706	4,386	3,469	7,268	3,675	232,600
Average NonTax Revenue $ per Household	435.51	713.03	1,042.30	1,225.74	1,392.58	1,634.10	704.24	616.27	579.72	619.10	1,561.14
OPERATING EXPENDITURES											
Operating Expenditures ($000)	172,648	13,436	70,521	20,008	53,928	71,280	8,468	6,228	14,265	7,262	438,044
Per Household $ Cost	1,158.43	1,479.57	1,642.70	1,524.88	2,211.98	2,441.60	1,359.67	1,106.41	1,137.83	1,223.38	2,939.18
Solid Waste Management ($000)	0	975	5,903	2,313	2,216	5,701	873	526	1,264	1,037	20,808
Per Household $ Cost	0.00	107.37	137.50	176.28	90.89	195.28	140.17	93.44	100.82	174.70	139.62
*Net Waste Divern Budget ($000)	1,426	269	1,810	686	2,100	808	131	172	145	222	7,769
Per Household $ Cost	9.57	29.62	42.16	52.28	86.14	27.68	21.03	30.56	11.57	37.40	52.13
% Waste Diversion to Operating Costs	0.8	2.0	2.6	3.4	3.9	1.1	1.5	2.8	1.0	3.1	1.8
DEBT											
Debt Outstanding ($000)	14,869	29	4,466	2,312	6,004	4,027	1,361	468	5,639	37	39,212
Per Household $ Cost	99.77	3.19	104.03	176.21	246.27	137.94	218.53	83.14	449.79	6.23	263.10
Debt Charges ($000)	3,007	16	1,193	715	1,744	1,038	347	103	985	35	9,183
Per Household $ Cost	20.18	1.76	27.79	54.49	71.53	35.56	55.72	18.30	78.57	5.90	61.62
RESERVES/RESERVE FUNDS											
Reserves/Reserve Funds ($000)	91,868	16,328	50,421	1,547	63,652	42,401	6,650	1,944	6,452	4,718	285,981
Per Household % Cost	616.41	1,798.04	1,174.49	117.90	2,610.83	1,452.39	1,067.76	345.35	514.64	794.81	1,918.87

SOURCE: Ministry of Municipal Affairs – MARS FIR's 1990 *Future Urban Research Budget Analysis

In 1990, York Region maintained a population of 409,300 with a total number of households approaching 149,000, thus yielding a persons per household average of 2.7. By far the largest municipality in York is Markham, with a population of 129,500 (42,900 households); followed by Vaughan (population 88,500 and households 29,200); Richmond Hill (population 57,100 and households 24,400) and, Newmarket (population 37,300 and households 13,100). All other municipalities in York Region, Aurora, Georgina, Whitchurch-Stouffville, East Gwillimbury and King, have populations less than 25,000 with households of less than 12,000.

4.1.3.1 Property Assessment, Tax and Other Revenue

Total revenues; including property tax, grants, program fees and other revenues for York Region were $485 million in 1990.

On average, residential assessment in York Region in 1990 approached 73% of the total tax base, with the commercial/industrial sector representing the remaining 27%. This residential/commercial split, however, varied considerably among area municipalities. On the one hand, the City of Vaughan maintained a commercial/industrial sector that represented 36% of the tax base. Aurora, Markham, Newmarket and Richmond Hill maintained commercial/industrial ratios between 20% and 28%. In the smaller municipalities, however, the commercial/industrial sectors ranged between 7 and 16% of the tax base.

On average, residential property taxes in York Region approached $2,957 per household in 1990. This consisted of $313 for local purposes; $519 per household for the Regional levy; $208 in direct charges; and, $1,917 for school purposes. In 1990, the school portion of property taxes approached 65%, with the Regional levy approaching 18% with the local levy being 11%. While property taxes for Regional and local purposes totalled $207 million in 1990, 64% ($133.6 million) was derived from the residential sector with 36% ($73.6 million) paid by the commercial/industrial sector.

In total in 1990, property taxes represented 52% of all of the municipalities revenue sources. Provincial and Federal grants totalled $84.7 million in 1990 and this represented 18% of total revenue. Similarly, program revenue (user charges, water revenues, recreation fees, etc.) totalled $100.5 million in 1990 and this represented 20% of total revenue. On average, non-tax revenues approached $1,560 per household in York Region in 1990.

4.1.3.2 Operating Expenditures

In total, operating expenditures in York Region approached $438 million in 1990. The Region itself accounted for $173 million, with the area municipalities totalling $265 million. Regional expenditures primarily related to Social Services - $53.8 million; Police - $51.5 million; and, Waterworks and Sanitary Sewage - $41.6 million. Local expenditures, on the other hand, primarily related to Recreation - $66.4 million; Road Maintenance and Repair - $62.1 million; and, Fire Protection - $40.2 million.

Waste Management costs in York Region (Region and area municipalities) totalled $20.8 million in 1990. When the 1992 budget figures of $7.7 million for waste diversion are compared, it can be shown that waste diversion represented 37% of York Region's 1990 waste management budget. Similarly, waste diversion represented 1.8% of the total area's 1990 operating expenditures of $438 million.

When expressed on a per household basis Regional expenditures approach $1,158 and local expenditures average $1,780 per household. In total, municipal operating costs exceed $2,939 per household. Per household cost figures for diversion shown in Table 4.3 are net of grants, material sales and other funding.

4.1.3.3 Capital Expenditures and Reserves

In 1990, capital expenditures for the York area (Region and area municipalities) approached $200 million and this consisted mainly of Road Maintenance and Repair - $69.4 million; Recreation - $47.7 million; General Government - $36.4 million; and, Water and sewer - $29.3 million. These capital expenditures were funded from: reserves and reserve funds - 51%; debenture borrowing - 22%; Provincial Grants - 9%; and, general tax revenue 9%.

Total outstanding debt in the York area in 1990 approached $39.2 million, of which $14.8 million was held by the Region. This represented an average of $263 per household when both the Region and area municipalities are combined. To pay this debt, debt charges in the York area total $9.2 million per year and this represented about $61 per household. When expressed as a percentage of expenditures, which is recommended by the Ministry of Municipal Affairs debt capacity guideline, debt charges for the entire Regional area in 1990 represented 2.1% of total revenue.

In 1990, reserve funds totalled $285.9 million for both the Region and the area municipalities. The Region itself maintained $91.8 million in reserves and reserve funds

while the area municipalities maintained \$194.1 million. When combined, these funds represented a 65% coverage of annual operating expenditures and, in total, these funds approach \$1,919 per household.

4.1.4 Peel Region (Municipal Finance)

Table 4.4 summarizes the financial profile for Peel Region and its constituent area municipalities. A complete financial profile is presented in the Municipal Finance Technical Appendix.

In 1990, Peel Region maintained a population of 608,300 with a total number of households approaching 224,100, thus yielding a persons per household average of 2.7. The largest municipality in Peel is Mississauga, with a population of 385,150 (142,700 households); followed by Brampton (population 192,000 and households 70,200); and Caledon (population 31,100 and households 11,150).

4.1.4.1 Property Assessment, Tax and Other Revenue

Total revenue; including property tax, grants, program fees and other revenue for Peel Region were \$829 million in 1990.

On average, residential assessment in Peel Region in 1990 approached 67% of the total tax base, with the commercial/industrial sector representing the remaining 33%. This residential/commercial split was relatively similar throughout Peel Region except for Caledon. The City of Mississauga maintained a commercial/industrial sector that represented 35% of the tax base, while Brampton's ratio approached 32% and Caledon's ratio approached 13%.

On average, residential property taxes in Peel Region approached \$2,135 per household in 1990. This consisted of \$483 for local purposes, \$325 per household for the Regional levy, \$184 in direct charges, and, \$1,192 for school purposes. In 1990, the school portion of property taxes approached 56%, with the Regional levy approaching 15% and the local levy being 20%. While property taxes for Regional and local purposes totalled \$335 million in 1990, 60% (\$202.8 million) was derived from the residential sector with 40% (\$131.9 million) paid by the commercial/industrial sector. (This latter ratio is larger than the property assessment ratio for the commercial/industrial sector because this sector also pays business taxes in addition to property taxes.)

TABLE 4.4

PEEL REGION FINANCIAL PROFILE

REGION OF PEEL	RMP	Brampton	Mississauga	Caledon	TOTAL
HOUSEHOLDS	224,092	70,195	142,738	11,159	224,092
ASSESSMENT & TAX					
Residential Portion Percentage	66.6	67.7	64.7	86.4	66.6
Commercial/Other Portion Percentage	33.4	32.3	35.3	13.6	33.4
Tax Levy					
Average Residential Share of Tax Levy $ per Household					
– Local	433.97				
– Regional	324.98				
– Direct Charges	184.00				
– School Board	1,192.08				
Total Tax Levy	2,135.03				
REVENUE DISTRIBUTION					
Property Tax %	48.0	58.1	50.0	65.7	50.2
Grants %	21.8	10.1	16.6	15.9	16.8
Program & Other %	19.3	15.7	14.6	6.8	17.2
Fees & Service Charges %	11.0	16.0	18.9	11.6	15.8
Total	100.0	100.0	100.0	100.0	100.0
Non-Tax Revenue ($000)	243,323	43,878	120,949	5,241	413,391
Average NonTax Revenue/Household	1,085.82	625.09	847.35	469.67	1,844.74
OPERATING EXPENDITURES					
Operating Expenditures ($000)	385,619	108,095	244,922	15,607	754,243
Per Household $ Cost	1,720.81	1,539.92	1,715.89	1,398.60	3,365.77
Solid Waste Management ($000)	43,860	3,877	8,809	973	57,519
Per Household $ Cost	195.72	55.23	61.71	87.19	256.68
*Net Waste Diversion Budget ($000)	1,827	3,169	5,111	561	10,668
Per Household $ Cost	8.15	45.15	35.81	50.27	47.61
% Waste Diversion to Operating Costs	0.5	2.9	2.1	3.6	1.4
DEBT					
Debt Outstanding ($000)	65,032	36,584	5,098	1,087	107,801
Per Household $ Cost	290.20	521.18	35.72	97.41	481.06
Debt Charges ($000)	25,832	9,458	3,306	355	38,951
Per Household $ Cost	115.27	134.74	23.16	31.81	173.82
RESERVES/RESERVE FUNDS					
Reserves/Reserve Funds ($000)	275,651	63,373	297,548	3,491	640,063
Per Household $ Cost	1,230.08	902.81	2,084.57	312.84	2,856.25

SOURCE: Ministry of Municipal Affairs – MARS FIR's 1990 *Future Urban Research Budget Analysis

In total in 1990, property taxes represented 50% of all of the municipalities revenue sources. Provincial and Federal grants totalled $139 million in 1990 and this represented 16% of total revenue. Similarly, program revenue (user charges, water revenues, recreation fees, etc.) totalled $142.8 million in 1990 and this represented 17% of total revenue. On average, non-tax revenues approached $1,845 per household in Peel in 1990.

4.1.4.2 Operating Expenditures

In total, operating expenditures in Peel Region approached $754 million in 1990. The Region itself accounted for $386 million, with Mississauga totalling $245 million, Brampton $108 million and Caledon $15.6 million. Regional expenditures primarily related to Social Services - $104 million; Waterworks and Sanitary Sewage - $99.1 million; and Police - $97.7 million. Local expenditures, on the other hand, primarily related to Road Maintenance and Repair - $80.9 million; Recreation - $76.0 million; and Fire Protection - $60.5 million.

Waste Management costs in Peel Region (Region and area municipalities) totalled $57.5 million in 1990. When the 1992 budget figures of $10.7 million for waste diversion are compared, it can be shown that waste diversion represented 19% of the Region's 1990 waste management budget. Similarly, waste diversion represented 1.4% of the total area's 1990 operating expenditures of $754 million. Per household cost figures for diversion shown on Table 4.4 are net of grants, material sales and other funding.

When expressed on a per household basis Regional expenditures approach $1,720.00 and local expenditures average $1,645 per household. In total, municipal operating costs exceed $3,365 per household.

4.1.4.3 Capital Expenditures and Reserves

In 1990, capital expenditures for the Peel area (Region and area municipalities) approached $258 million and this consisted mainly of Road Maintenance and Repair - $114.7 million; Recreation - $50.9 million; Water and sewer - $39.0 million; General Government - $25.1 million and Waste Disposal - $6.0 million. These capital expenditures were funded from: reserves and reserve funds - 67%; Provincial Grants - 18%; and, general tax revenue 11%. Debenture financing in 1990 only consisted of $20,000 and this represented a small fraction of 1% of total revenue.

Total outstanding debt in the Peel area in 1990 approached $107.8 million, of which $65.0 was held by the Region. This represented an average of $481 per household when both the Region and area municipalities are combined. To pay this debt, debt charges in the Peel area total $38.9 million per year and this represented about $174 per household. When expressed as a percentage of expenditures, which is recommended by the Ministry of Municipal Affairs debt capacity guideline, debt charges for the entire Regional area in 1990 represented 5.2% (see Municipal Finance Technical Appendix for a full reference).

In 1990, reserve funds totalled $640.0 million for both the Region and the area municipalities. The Region itself maintained $275.6 million in reserves and reserve funds while the area municipalities maintained $364.4 million. When combined, these funds represented a 85% coverage of annual operating expenditures and, in total, these funds approached $2,856 per household.

4.2 Natural Environment

This section provides an overview of the existing natural environment conditions in each of the Regions. The ground water, surface water and biological aspects are presented as these are natural environment features which could be affected by the 3Rs systems. Although the potential for effects to the atmospheric environment are examined in the 3Rs system net effects analysis, the atmospheric environment is not described here. The description of the natural environment in each region is provided to identify existing conditions and to provide a basis for assessing alternative 3Rs systems. This information was used to facilitate the prediction of natural environment impacts, when comparing and evaluating alternative 3Rs systems for each of the regions.

The Natural Environment Technical Appendix provides a more detailed description of the existing environment conditions for each of the Regions.

4.2.1 Durham Region (Natural Environment)

4.2.1.1 Major Aquifers and Ground Water Use

Major aquifers occur throughout Durham Region. These include both overburden and bedrock aquifers. Substantial quantities of ground water are available from the major overburden aquifers in the area. Municipal and domestic water supplies are provided from overburden aquifers.

Much of the southern portion of Durham Region, south of the Oak Ridges Moraine, is urban land which is serviced by water from Lake Ontario. Urban growth is expanding northward from the built-up area along the Lake Ontario shoreline. As this occurs, more communities are switching from traditional ground water supplies to Lake Ontario water. Major overburden aquifers in the South Slope aquifer complex are therefore gradually being replaced as a source of domestic water supply. However, the demand for municipal ground water supplies from the Oak Ridges Moraine are presently increasing for communities to the north as residential development continues to increase the demand for water.

Bedrock aquifers are not heavily utilized as a source of municipal or domestic water in Durham Region due to the abundance of overburden aquifers and the relatively poor aquifer characteristics of the bedrock. Exceptions to this occur where there is a shallow depth to bedrock and no alternative water supplies are available.

4.2.1.2 Surface Water and Surface Water Use

Durham Region is situated in three major watersheds, namely:

- Lake Simcoe/Georgian Bay;
- Lake Ontario; and
- Trent River System.

The major surface water body in the area is Lake Ontario. Durham Region borders on Lake Ontario. Two other major lakes in the Region include Lake Simcoe and Lake Scugog.

A number of active water quality stations are located on rivers and streams in the Region. These stations are part of the Provincial Water Quality Monitoring Network operated by the MOEE. In addition to routine data collection, special studies have been undertaken on some watercourses, including Wilmot Creek.

Water quality in streams in the area is generally impacted by both point source and diffuse source inputs including:

- sewage treatment plant effluent;
- industrial discharges;
- urban land use;
- transportation corridors; and
- agricultural land use.

Provincial Water Quality Objectives are exceeded for several parameters at stations throughout Durham Region. Better water quality is likely to be found in the head water areas of watercourses where point source inputs and urban land use are absent and agricultural intensity is low. Important fisheries occur in several streams throughout the area.

Surface water in Durham Region is used for a wide variety of purposes including:

- aquatic life;
- recreation;
- drinking water supply;
- industrial water;
- agriculture; and
- waste assimilation.

Several major water uses occur along the Lake Ontario shoreline. These include intakes for municipalities and industries, and sewage plant outfalls.

4.2.1.3 Biological Characterization

The portion of the study area which drains to Lake Ontario is heavily urbanized. This has resulted in negative impacts on stream flow and water quality, which in turn have affected the structure of fish communities. Natural vegetation consists of remnant woodlots and treed river valley and ravine areas. These areas provide habitat for plant and animal species.

Major rivers in or near Durham Region within the Lake Ontario drainage basin include the Rouge and Ganaraska. Considerable effort has been expended in developing an anadromous salmonid fishery in this area. Major watercourses in the Region within the Lake Simcoe drainage basis include Pefferlaw Brook and Beaverton River. These watercourses generally support warm-water fish populations. Agricultural land uses are prominent in the basins of the watercourses draining to Lake Simcoe.

The Oak Ridges Moraine is a prominent topographic feature in Durham Region which acts as a watershed divide between the Lake Ontario and Lake Simcoe drainages. It lies in an east-west direction in the middle of the area. The Moraine is of biological significance because it contains large tracts of forest and it contributes baseflow to headwater areas of cold and cool-water streams.

The southern part of the study area is within the Deciduous Forest Region. Plant communities having southern affinities are well represented, for example, in the valley of the Rouge River. The northern part of the study area is situated within the Great Lakes - St. Lawrence Forest Region.

The biology of most of Durham Region has been relatively well studied. Basin and Regional surveys have established the status of bird and plant species, in particular.

4.2.2 Metro Toronto (Natural Environment)

4.2.2.1 Major Aquifers and Ground Water Use

Major aquifers occur throughout Metro Toronto Region. These include both overburden and bedrock aquifers. Substantial quantities of ground water are available from the major overburden aquifers in the area.

Metro Toronto is generally urban land which is serviced by water from Lake Ontario. Urban growth has expanded northward from the Lake Ontario shoreline. Communities in the Region have switched from traditional ground water supplies to Lake Ontario water.

4.2.2.2 Surface Water and Surface Water Use

Metro Toronto is situated in the Lake Ontario watershed. Surface water in the Region drains southwards to Lake Ontario.

Water quality stations are located on rivers and streams in the Region. These stations are part of the Provincial Water Quality Monitoring Network operated by the MOEE. In addition to routine data collection, many special studies have been undertaken throughout the area including Mimico Creek, Humber River and the Don River.

Water quality in streams in the Region is generally impacted by both point source and diffuse source inputs including:

- sewage treatment plant effluent;
- industrial discharges;
- urban land use; and
- transportation corridors.

Provincial Water Quality Objectives are exceeded for several parameters at stations throughout the Region.

Lake Ontario has received much study by Provincial and Federal agencies due to its important role as a source of drinking water to communities along its shore, and its high recreational value.

Persistent toxic substances and eutrophication have been identified as problems in Lake Ontario by the International Joint Commission and its member agencies.

Areas of concern have been identified in the Great Lakes including one in Metro Toronto, namely Toronto Harbour. Provincial Water Quality Objectives are exceeded at this location. As a result, intensive studies have been initiated to develop remedial action plans; including the clean-up of beaches.

Surface water is used for a wide variety of purposes in Metro Toronto including:

- aquatic life;
- recreation;
- drinking water supply (Lake Ontario);
- industrial water; and
- waste assimilation.

Several major water uses occur along the Lake Ontario shoreline. These include intakes for municipalities and industries, and sewage plant outfalls.

4.2.2.3 Biological Characterization

Most of the Metro Toronto is heavily urbanized. This has resulted in negative impacts on stream flow and water quality, which in turn have affected the structure of fish communities. Natural vegetation consists of remnant woodlots and treed river valley and ravine areas. These areas provide habitat for plant and animal species.

Major rivers in Metro Toronto and within the Lake Ontario drainage basins include: the Humber, Don, Highland Creek and Rouge. Considerable effort has been expended in developing an anadromous salmonid fishery in these areas. The Oak Ridges Moraine is a prominent topographic feature north of Metro Toronto which acts as a watershed divide between the Lake Ontario and Lake Simcoe drainages. The moraine is of biological

significance because it contains large tracts of forest and it contributes baseflow to headwater areas of the cold and cool-water streams.

Metro Toronto is within the Deciduous Forest Region. Plant communities having southern affinities (e.g. Carolinian) are well represented, for example, in the valley of the Rouge River.

The biology of the Region has been relatively well studied. Basin and Regional surveys have established the status of bird and plant species.

4.2.3 York Region (Natural Environment)

4.2.3.1 Major Aquifers and Ground Water Use

Major aquifers occur throughout the York Region. These include both overburden and bedrock aquifers. Substantial quantities of ground water are available from the major overburden aquifers in the area. Municipal and domestic water supplies are provided from overburden aquifers.

Much of York Region, south of the Oak Ridges Moraine, is urban land which is serviced by water from Lake Ontario. Urban growth is expanding northward from the Metro Toronto area. As this occurs, more communities are switching from traditional ground water supplies to Lake Ontario water. Major overburden aquifers in the South Slope aquifer complex are therefore gradually being replaced as a source of domestic water supply. However, the demand for municipal ground water supplies from the Oak Ridges Moraine and deep overburden aquifers within bedrock valleys are presently increasing for communities in the northern part of the Region (Aurora, Newmarket) as residential development continues to increase the demand for water.

Bedrock aquifers are not heavily utilized as a source of municipal or domestic water in the Region due to the abundance of overburden aquifers and the relatively poor aquifer characteristics of the bedrock. Exceptions to this occur where there is a shallow depth to bedrock and no alternative water supplies are available.

4.2.3.2 Surface Water and Surface Water Use

York Region is situated in two major watersheds, namely:

- Lake Simcoe/Georgian Bay; and
- Lake Ontario.

The drainage divide between these two major watersheds runs from east to west through the middle of the Region. The drainage divide parallels the Oak Ridges Moraine.

Active water quality stations are located on rivers and streams in York Region. These stations are part of the Provincial Water Quality Monitoring Network operated by the MOEE. In addition to routine data collection, many special studies have been undertaken on some watercourses including: the Humber River, Don River, Holland River and Black River.

Water quality in streams in the area is generally impacted by both point source and diffuse source inputs including:

- sewage treatment plant effluent;
- industrial discharges;
- urban land use;
- transportation corridors; and
- agricultural land use.

Provincial Water Quality Objectives are exceeded for several parameters at stations throughout the Region. Better water quality is likely to be found in the headwater areas of watercourses where point source inputs and urban land use are absent and agricultural intensity is low. Important fisheries occur in several streams throughout the area.

Surface water in York Region is used for a wide variety of purposes including:

- aquatic life;
- recreation;
- drinking water supply;
- industrial water;
- agriculture; and
- waste assimilation.

4.2.3.3 Biological Characterization

Major rivers in the Region within the Lake Ontario drainage basin include: the Humber, Don and Rouge. Considerable effort has been expended in developing an anadromous salmonid fishery in these areas. Major watercourses in the Region within the Lake Simcoe drainage basin include: the Holland River, Black River and Pefferlaw Brook. These watercourses generally support warm-water fish populations. Agricultural land uses are prominent in the basins of the watercourses draining to Lake Simcoe.

Marshes at the mouths of certain of these watercourses are of biological significance. Nearshore areas of Lake Simcoe may also be of biological importance.

The Oak Ridges Moraine is a prominent topographic feature in York Region which acts as a watershed divide between the Lake Ontario and Lake Simcoe drainages. The Moraine is of biological significance because it contains large tracts of forest and it contributes baseflow to headwater areas of the cold and cool-water streams.

The southern part of the Region is within the Deciduous Forest Region. Plant communities having southern affinities are well represented, for example, in the valley of the Rouge River. The northern part of the study area is situated within the Great Lakes-St. Lawrence Forest Region.

The biology of most of the Region has been relatively well studied. Basin and Regional surveys have established the status of bird and plant species, in particular.

4.2.4 Peel Region (Natural Environment)

4.2.4.1 Major Aquifers and Ground Water Use

Major aquifers occur throughout Peel Region. These include both overburden and bedrock aquifers. Substantial quantities of ground water are available from the major bedrock and overburden aquifers in the area. Some municipal and domestic water supplies are provided from bedrock and overburden aquifers. Peel Region has a complete hydrogeologic setting as a result of its diverse geological history. Generally, relatively permeable glacial deposits in the northern portion of the Region act as ground water recharge areas to overburden aquifers and the bedrock.

Peel Region has a complex hydrogeologic setting as a result of its diverse geological history. In general, relatively permeable glacial deposits (ice contact stratified drift) in the

northern portion act as ground water recharge areas to overburden aquifers and the bedrock.

Much of the southern portion of Peel Region is urban land which is serviced by water from Lake Ontario. Urban growth continues to expand northward from the built-up area (Mississauga) on Lake Ontario. As this growth occurs, communities will continue to switch from traditional ground water supplies to Lake Ontario water. Generally, the municipalities in Peel Region located north of Brampton rely on ground water as the source of their domestic water supply.

4.2.4.2 Surface Water and Surface Water Use

Peel Region is situated in two major watershed, namely:

- Lake Simcoe/Georgian Bay; and
- Lake Ontario.

The majority of Peel Region drains southeast to Lake Ontario. This represents the area south of the Oak Ridges Moraine (approximately).

The major streams in this area are:

- Humber River;
- Credit River;
- Etobicoke Creek; and
- Mimico Creek.

A very small area in the northern part of Peel Region (north of the Oak Ridges Moraine) drains to Georgian Bay and Lake Simcoe. There are no major streams for this drainage system in Peel Region. Surface water drains to the Nottawasaga River, Bailey Creek and Holland River, which are situated outside of the Region.

The major surface water body in the area is Lake Ontario.

Water quality in streams in the Region is generally impacted by point source and diffuse source inputs including:

- sewage treatment plant effluent;
- industrial discharges;

- urban land use;
- transportation corridors; and
- agricultural land use.

Provincial Water Quality Objectives are exceeded for several parameters at monitoring stations in the Region. Improved water quality is likely to be found in the head water areas of watercourses where point source inputs and urban land use are absent and agricultural intensity is low.

Lake Ontario is the only major lake in the area. A great deal of study has been conducted on Lake Ontario due to its important role as a source of drinking water to communities along its shore and its high recreational value.

Surface water in Peel Region is used for a wide variety of purposes including:

- aquatic life;
- recreation;
- drinking water supply;
- industrial water;
- agriculture; and
- waste assimilation

Several major water uses occur along the Lake Ontario shoreline. These include intakes for municipalities and industries, and sewage plant outfalls.

4.2.4.3 Biological Characterization

Significant natural environment features exist in the Region of Peel. These natural environment features include:

- provincial parks and Conservation Authority lands;
- hazard lands (as identified in official plans);
- environmentally significant areas;
- areas of natural and scientific interest (ANSI's-life and earth sciences);
- provincially and regionally significant wetlands (Class 1-7);
- OMNR Agreement and Woodlot Improvement Act (WIA) forests;
- licensed pits and quarries;
- significant warm water and cold water watercourses.

The Region of Peel is located in the Great Lakes St. Lawrence Forest Region. Natural woody vegetation in this regime is characterized by eastern white and red pines, eastern hemlock and yellowbirch. The majority of the forested areas of the Region lie within Caledon reflecting the rural character of the Town. Extensive urban development has removed much of the large wooded areas in the City of Mississauga and to a lesser degree in the City of Brampton. In these areas, forest resources are generally restricted to scattered woodlots, ravines and environmentally protected areas. The forest management potential generally is low in Mississauga, low to moderate in the City of Brampton and moderate to high in the Town of Caledon. Similarly, important wildlife resource areas associated with valleylands, upland habitat (e.g. Niagara Escarpment) and ravines are more concentrated in the Town of Caledon. Important ravines are also associated with the Lake Ontario shoreline.

The cold-water headwaters of the Credit and Humber Rivers lie within the northern half of Caledon which has been identified by MNR as a cold-water stream zone.

4.3 Social Environment

The Existing Social Environment of the GTA is described through the analysis of demographic, housing and employment characteristics and trends. This information was used in the GTA 3Rs analysis for three purposes: to forecast future waste generation; to assess whether future social characteristics will influence the achievement of waste diversion efforts; and to provide a basis for the assessment of potential social effects in each Region and the GTA. The method of analysis used is described in the Social Environment Technical Appendix.

4.3.1 GTA (Social Environment)

Demographic Characteristics

Demographic information was used in the GTA 3Rs analysis to determine the current population characteristics of each Region, how the population is changing and to calculate future waste projections. Demographic information assists in determining for example, whether residents are generally older and perhaps less able to engage in strenuous 3Rs activities, or younger and possibly more enthusiastic about ensuring that their households are involved in waste diversion activities.

The GTA is the most populous urban Region in Canada and comprises 41% of Ontario's population and 14.7% of Canada's population (Canadian Urban Institute, 1991a). The GTA has experienced considerable growth since the early 1980s and will continue to be the major growth centre of the Province of Ontario over the planning period.

As indicated on Table 4.5, the GTA has registered a 1991 population of 4,235,756 representing growth of 10.2% from 1986. Within the GTA, Metro Toronto has over half of the population at 2,275,771, representing 53.7% of the total population. The next largest population concentration occurs in Peel Region with 732,798 residents and 17.3% of the GTA population.

York Region and Durham Region have similar population levels. Halton has the smallest population of the GTA. York, Durham and Halton Regions respectively have 11.9, 9.6 and 7.3% of the population of the GTA.

Population growth in the Toronto Census Metropolitan Area (CMA) is being driven primarily by immigration, although it is currently at 60% of the late 1980s levels (CMHC, 1993a). The Toronto CMA encompasses Metro Toronto, Peel Region, York Region, Halton Region except Burlington and part of Durham Region, not including Oshawa and Whitby. As seen on Table 4.6, Clayton Research Associates indicates that Peel and York Regions grew fastest over the last decade and they will continue to do so. However, over the later phases of the GTA 3Rs planning period, Durham Region is also expected to experience greater population growth. Overall, the Regional Municipalities are expected to absorb significantly greater growth than Metro Toronto to the year 2015 and beyond. By 2011, Durham, York and Peel are anticipated to capture approximately 77% of the growth in the GTA.

The population projections selected for the GTA 3Rs Analysis are presented in Table 4.7.

TABLE 4.5
POPULATION LEVELS

District	Mun.	1981	1986	1987	1988	1989	1990	1991
Metro Toronto		2,110,973	2,175,900	2,125,520	2,133,559	2,130,855	2,137,204	2,275,771
	East York	99,116	97,051	96,705	96,497	95,662	94,701	102,696
	Etobicoke	296,277	297,389	295,051	293,433	294,958	296,107	309,933
	North York	560,899	551,318	550,678	544,560	542,742	548,040	562,564
	Scarborough	428,264	461,480	461,261	470,406	472,029	470,670	542,598
	Toronto	599,282	612,290	590,215	597,126	594,051	595,074	635,395
	York	132,336	132,673	131,610	131,537	131,413	132,612	140,525
Durham		283,639	326,179	340,570	347,837	385,480	397,540	409,070
	Oshawa	117,519	123,651	124,700	120,904	132,135	133,910	129,344
	Ajax	25,475	36,550	40,085	45,046	49,950	52,825	57,350
	Newcastle	32,229	34,073	36,130	37,769	43,850	45,915	49,479
	Pickering	37,754	48,959	53,055	56,132	62,980	65,315	68,631
	Whitby	36,698	45,819	48,605	49,948	55,310	57,245	61,281
	Brock Twp.	9,259	10,003	10,145	10,082	10,755	10,935	11,057
	Scugog Twp.	13,498	15,229	15,675	15,675	17,230	17,710	17,810
	Uxbridge Twp.	11,207	11,895	12,175	12,281	13,270	13,685	14,090
Halton		250,698	271,389	275,945	284,994	291,600	297,650	313,136
	Burlington	112,940	116,675	117,562	120,098	122,300	124,599	129,575
	Halton Hills	34,507	35,570	34,360	34,189	34,800	35,750	36,816
	Milton	28,090	32,037	30,682	30,115	30,500	30,900	32,075
	Oakville	75,162	87,107	93,341	100,936	104,000	106,500	114,670
Peel		490,730	592,170	636,475	667,445	702,450	724,530	732,798
	Brampton	149,030	188,500	204,625	214,265	227,710	232,465	234,445
	Mississauga	315,055	374,055	399,835	419,700	440,500	457,275	463,388
	Caledon	26,645	29,665	32,015	33,480	34,240	34,790	34,965
York		252,053	350,602	386,103	409,292	442,022	466,791	504,981
	Vaughan	29,674	65,058	80,012	88,475	97,685	103,072	111,359
	Aurora	16,267	20,905	23,586	24,545	26,426	27,778	29,454
	East Gwillimbury	12,565	14,644	16,115	16,513	17,199	17,683	18,367
	Georgina	20,111	22,486	22,372	22,587	24,360	26,675	29,746
	Markham	77,037	114,597	121,950	129,501	136,924	141,880	153,811
	Newmarket	29,753	34,923	36,575	37,277	38,785	40,566	45,474
	Richmond Hill	37,778	46,766	52,103	57,082	66,456	73,739	80,142
	Whitchurch-Stouffville	13,557	15,135	17,007	16,705	16,963	17,683	18,357
	King Twp.	15,188	15,951	16,383	16,607	17,224	17,775	18,121
GTA		3,388,093	3,716,240	3,764,613	3,843,127	3,952,407	4,023,745	4,235,756

Source: Statistics Canada Census Data.

TABLE 4.6
SHARE OF POPULATION GROWTH BY REGION (BASE PROJECTION) (PERCENT)

	1981-1986	1986-1991	1991-2011	2011-2031
Metro Toronto	18	14	8	14
Durham	14	17	21	20
York	31	30	29	26
Peel	32	29	27	24
Halton	6	10	15	16

Source: Clayton Research Associates, 1991

TABLE 4.7
POPULATION PROJECTIONS BY REGION

YEAR	Metro Toronto	Durham	Halton	Peel	York
1991	2,275,800	409,075	313,136	744,700	504,981
1992	2,298,031	422,825	318,893	763,000	522,248
1993	2,320,480	438,380	324,756	784,500	540,106
1994	2,343,148	453,880	330,727	808,800	558,575
1995	2,366,037	469,335	336,807	833,500	577,675
1996	2,389,150	484,745	343,000	859,300	597,459
1997	2,404,140	500,120	351,538	879,500	615,017
1998	2,419,130	515,450	360,290	900,700	632,605
1999	2,434,120	530,750	369,259	921,900	650,193
2000	2,449,110	546,005	378,452	953,100	667,781
2001	2,464,100	561,230	387,873	974,300	685,370
2002	2,470,430	576,425	397,529	991,100	701,325
2003	2,476,760	592,125	407,425	1,007,900	717,280
2004	2,483,090	607,790	417,568	1,024,700	733,235
2005	2,489,420	623,420	427,963	1,041,500	749,190
2006	2,495,750	639,025	438,617	1,058,100	765,143
2007	2,502,080	654,600	449,536	1,072,100	780,277
2008	2,508,410	670,160	460,727	1,086,100	795,411
2009	2,514,740	685,690	472,197	1,100,100	810,545
2010	2,521,070	701,740	483,952	1,114,100	825,679
2011	2,527,400	717,780	496,000	1,127,900	840,019
2012	2,532,890	733,770	508,347	1,139,500	853,042
2013	2,538,380	749,695	521,002	1,150,500	865,270
2014	2,543,870	765,465	533,972	1,162,000	877,498
2015	2,549,360	781,045	547,265	1,173,500	889,726

Source: Clayton Research Associates Ltd., OGTA, Regional Municipalities and Hardy Stevenson and Associates

Lifestyle and Culture

Lifestyles and cultural data (e.g. age, income and other social characteristics) are important to the analysis of alternative 3Rs systems because the lifestyle and cultural context affect how 3Rs programs are accepted and the factors contributing to their implementation.

Table 4.8 (language) indicates that the current language diversity within the GTA varies considerably. The diversity of cultural groups will continue to grow over the planning period.

The nature and extent of cultural change over the planning period is strongly influenced by Federal immigration policy. Since 1986, 75% of the 154,000 immigrants to the Metro Toronto area were from Asia, the Caribbean, Latin America and Africa. Significant numbers have also immigrated from Poland and Portugal (Canadian Urban Institute, 1991b). At least 40% of the immigrants do not have a functional command of English and the rate is high among people whose mother tongue is Chinese, Vietnamese, Punjabi, Spanish and Portuguese.

Table 4.8 demonstrates a rise in language diversity, from 1986 to 1991 within the GTA. Overall, as the third largest language group, the Chinese population appears to be the fastest growing of the language groups in the GTA. Polish speaking people also increased as a proportion of GTA population. After English, Italian, Portuguese and Chinese speaking cultural groups are the next largest. GTA 3Rs educational and communications material should be oriented to these and other divergent language groups.

TABLE 4.8

SHIFTS IN LANGUAGE DIVERSITY

Mother Tongue		English	French	Italian	German	Chinese	Port	Polish	Other
Durham	1981	88.1	1.7	n/a	n/a	n/a	n/a	n/a	10.2
	1986	90.2	1.6	1.2	1.5	.3	.3	.7	4.3
	1991	89.1	1.8	1.2	.6	1.2	.4	.9	4.9
Halton	1981	85.8	1.9	n/a	n/a	n/a	n/a	n/a	12.3
	1986	87.6	1.7	1.4	1.8	.4	1.1	.6	5.3
	1991	86.2	1.7	1.5	1.6	.7	1.2	.8	6.2
Peel	1981	77.8	1.7	n/a	n/a	n/a	n/a	n/a	20.5
	1986	78.7	1.6	4.4	1.6	1.1	2.6	1.1	9.0
	1991	72.8	1.5	3.8	1.2	2.1	3.2	2.1	13.3
Metro Toronto	1981	67.7	1.5	n/a	n/a	n/a	n/a	n/a	30.8
	1986	69.1	1.3	6.7	1.6	3.9	2.8	1.4	13.1
	1991	64.2	1.3	5.3	1.3	6.1	3.0	1.8	17.1
York	1981	82.7	1.1	n/a	n/a	n/a	n/a	n/a	16.2
	1986	80.7	1.0	7.5	1.7	1.8	.3	.4	7.1
	1991	73.3	1.1	8.5	1.3	5.1	.5	.4	10.0
Total GTA	1981	73.3	1.5	n/a	n/a	n/a	n/a	n/a	25.2
	1986	74.9	1.4	5.5	1.6	2.7	2.2	1.1	10.5
	1991	70.9	1.4	4.7	1.2	4.4	2.3	1.5	13.5

Source: Adapted from 1981, 1986 and 1991 Census of Canada.

n/a: Not available.

Shift in Age Profile

Age characteristics of the GTA are indicated on Table 4.9. Overall, the GTA is experiencing a decline in the numbers of younger people as the baby-boom generation is no longer having children. There is also an increasing number of people over the age of 65.

Toward the year 2015, the number of people in the GTA younger than 19 is expected to continue to decline in proportion to other age groups. And, as seen on Table 4.10, the median age of the population will be increasing (IBI, 1990c) with a steady increase in the number of elderly. Today, the elderly (over 65 years) constitute over 10% of the

population. Over the next decade the proportion of elderly is expected to increase to 14% (Canadian Urban Institute, 1991b). As the population ages, more homes will be composed of "empty-nester" parents whose children live on their own, or single elderly individuals. This may influence the extent of adoption of GTA 3Rs components that require strenuous activities.

TABLE 4.9
GREATER TORONTO AREA - AGE PROFILE
1981, 1986, 1991

		0-19 Years		20-34 Years		35-54 Years		55-64 Years		65+ Years	
		Number	%	Number	%	Number	%	Number	%	Number	%
Metro Toronto	1981	578,015	27.0	596,025	27.9	521,975	24.4	215,270	10.0	226,130	10.6
	1986	520,420	24.0	632,075	28.8	554,430	35.1	236,635	10.8	252,160	11.5
	1991	509,175	22.4	649,399	28.5	598,900	26.3	227,210	10.0	291,095	12.8
Durham	1981	97,635	34.4	75,495	26.6	67,920	24.0	21,405	7.6	21,205	7.5
	1986	102,420	31.4	87,800	27.0	84,285	25.8	26,035	8.0	25,615	7.9
	1991	126,135	30.8	106,550	26.0	113,115	27.7	29,905	7.3	33,350	8.2
Halton	1981	85,605	33.7	62,085	24.4	67,815	26.7	20,735	8.1	17,635	6.9
	1986	81,240	30.0	65,065	24.0	76,690	28.3	25,745	9.5	22,650	8.4
	1991	87,575	28.0	74,380	23.7	92,735	29.6	28,290	9.0	30,164	9.6
Peel	1981	174,490	35.6	139,135	28.6	124,845	25.4	29,550	6.0	22,695	4.6
	1986	189,815	32.0	164,715	27.8	164,235	27.8	40,825	6.9	32,570	5.5
	1991	220,020	30.0	201,451	27.5	212,405	28.9	51,910	7.0	46,570	6.4
York	1981	42,455	32.8	33,490	25.9	28,585	22.1	11,195	8.6	13,715	10.6
	1986	113,935	32.5	87,390	24.9	99,025	28.2	25,940	7.4	24,315	6.9
	1991	158,805	31.5	120,410	23.8	153,355	30.4	36,835	7.3	35,560	7.0
GTA	1981	978,200	29.7	906,230	27.5	811,140	24.6	298,155	9.0	301,380	9.1
	1986	1,007,830	27.0	1,037,045	27.7	978,665	26.2	355,180	9.5	357,310	9.6
	1991	1,101,710	26.0	1,152,190	27.2	1,170,510	27.6	374,150	8.8	436,736	10.3

Source: Statistics Canada: Census Divisions, Census Families in Private Households, 1981; Statistics Canada, Part 1, Profiles, 1986; Statistics Canada, 1991.

It is predicted that municipal service provision will reflect an aging population will be targeted to: community health, culture and leisure, recreation involving less demanding sport, and senior citizen support services designed to allow them to remain in their homes (IBI, 1990c, p. 12). As the trend will be toward the integration of services, the integration of waste diversion programs may be influenced similarly.

TABLE 4.10
GREATER TORONTO AREA - MEDIAN AGE
ACTUAL AND PROJECTED

	1987		2011	
	Male	Female	Male	Female
Metro Toronto	31.5	33.9	41.9	45.6
Durham	29.3	30.2	35.3	37.0
Halton	30.9	32.6	37.4	39.7
Peel	28.6	29.4	36.3	38.2
York	29.7	30.4	34.7	36.3
ONTARIO TOTAL	31.4	33.1	39.7	42.7

Source: Demographic Bulletin, Population Projections for Regional Municipalities, Counties and Districts of Ontario to 2011

Shift in Family Profile

Across the GTA, children and teenagers are expected to be raised increasingly in single-parent family households and family households containing children of different parents (blended families) (Canadian Urban Institute, 1991b).

To adjust to these changes, service providers in the GTA have moved toward rationalizing and integrating community-based services and facilities through future community hub-centres (e.g. based in school buildings). Any financial and time requirements that might be associated with waste diversion activities must be assessed in light of the time involved per family and other household costs. A shift toward convenience of the waste diversion activities and adaptability to demographic and neighbourhood conditions would likely assist diversion.

Shift in Income Profile

When comparing incomes, York Region continues to have the highest income while Durham Region has the lowest income of all Regions in the GTA as indicated on Table 4.11. Understanding the differences in household income on a regional basis is useful in the design and planning of the 3Rs system. For example, in regions where the average household income is lower and there is less discretionary income, there may be less willingness to pay for a subsidized composter, which would be viewed as a

non-essential good. In less wealthy regions, it may be necessary to subsidize programs to a greater extent.

TABLE 4.11
GREATER TORONTO AREA
AVERAGE INCOME BY HOUSEHOLD

	1981	1986
Metro Toronto	$27,476	$40,493
Durham	27,235	38,526
Halton	32,208	48,354
Peel	31,501	46,630
York	33,288	52,206
GTA	28,699	42,674

Source: Statistics Canada, 1981 Income; Statistics Canada, Profiles, Ontario Part 2, 1986 and 1981 and 1986 Household

Across the GTA, the further automation of jobs, loss of traditional manufacturing jobs and slow growth in the construction sector may have a negative effect on people deriving their income from blue-collar occupations. Many of the new jobs to be created will either be higher income, high skilled service sector jobs or low-paying part-time employment.

On the other side of the spectrum, the Canadian Urban Institute further predicts the feminization of poverty, particularly among single parent households. Poverty will be further intertwined with race and ethnicity. Social services in the GTA are moving in the direction of being cost efficient (IBI, 1990c) to address this trend. To be effective, waste diversion activities must also ensure that efficiencies are achieved and programs are sensitive to the needs of the changing income strata in Metro Toronto and the GTA.

Housing

Information about housing supports the GTA 3Rs Analysis by considering whether waste diversion opportunities should focus on 3Rs components appropriate to each type of housing. In addition, information about households helped to determine whether people were owners or tenants, as a factor in the direct or indirect levy of collection fees. Across the GTA, several housing characteristics and trends have implications for the GTA 3Rs Analysis.

Current Household Characteristics

The GTA had a total of 1.487 million households in 1991. As indicated on Table 4.12, household size across the GTA varied from 3.5 persons per household in Markham to a low of 2.3 persons per household in East York and Toronto. Most of the housing within the GTA is owned by the occupants. However as indicated in Table 4.13, rates of home ownership vary considerably from a high of 82% in York Region to a low of 48% in Metro Toronto. The variation in rental and ownership rates has implications to the GTA 3Rs Analysis in terms of assumptions about the extent to which waste diversion activities depend on curbside pick-up or the efficiency of components that rely on Direct Cost diversion efforts.

The type of households also varies across the GTA and within each Region. For example, Table 4.14 indicates that Metro Toronto is dominated by high-rise apartments closely followed by single family homes. Metro Toronto also has the highest percent of low-rise apartment housing stock in the GTA. In contrast, Durham Region has the most single family housing and the least amount of high-rise.

TABLE 4.12
HOUSEHOLDS AND HOUSEHOLD SIZE BY REGION

YEAR		1986 Households	Household Size	1991 Households	Household Size
Metro Toronto		827,492	2.58	864,555	2.63
	East York	43,589	2.23	44,475	2.3
	Etobicoke	119,900	2.66	115,230	2.7
	North York	198,298	2.78	203,145	2.7
	Scarborough	162,251	2.84	174,915	3.0
	Toronto	257,428	2.30	270,660	2.3
	York	54,026	2.46	56,130	2.5
Durham		106,930	3.05	136,135	3.0
	Ajax	11,790	3.10	18,085	3.1
	Brock	3,450	2.90	3,920	2.8
	Newcastle	10,940	3.12	16,380	3.0
	Oshawa	42,670	2.89	46,945	2.7
	Pickering	14,575	3.36	20,515	3.3
	Scugog	5,005	3.04	5,965	3.0
	Uxbridge	3,875	3.07	4,730	2.9
	Whitby	14,625	3.13	19,580	3.1
Halton		89,830	3.02	106,420	2.90
	Oakville	28,725	3.03	37,910	2.99
	Burlington	40,120	2.91	46,240	2.77
	Milton	9,735	3.29	10,070	3.09
	Halton Hills	-	-	12,200	2.97
Peel		185,870	3.19	229,665	3.17
	Brampton	56,885	3.31	70,785	3.29
	Mississauga	120,025	3.12	148,240	3.10
	Caledon	8,960	3.31	10,745	3.23
York		105,195	3.33	150,485	3.3
	Vaughan	17,757	3.70	29,855	3.7
	Aurora	6,640	3.15	9,375	3.1
	East Gwillimbury	4,330	3.38	5,570	3.2
	Georgina	7,640	2.94	10,455	2.8
	Markham	33,355	3.44	43,655	3.5
	Newmarket	10,685	3.27	14,175	3.1
	Richmond Hill	15,070	3.10	25,550	3.1
	Whitchurch-Stouffville	4,865	3.11	6,050	3.0
	King Twp.	4,935	3.23	5,745	3.1
GTA		1,315,317	2.83	1,487,260	2.85

Source: 1986, 1991 Census Data, Regional Planning Departments

TABLE 4.13
OWNERSHIP/RENTAL CHARACTERISTICS: 1991

REGION	OWNERS	%	RENTAL	%	TOTAL HOUSEHOLD	%
METRO TORONTO	415,450	48.05	449,105	51.95	864,555	100
DURHAM	101,780	74.76	34,360	25.24	136,135	100
HALTON	79,045	74.28	27,375	25.72	106,420	100
PEEL	156,950	68.34	72,720	31.66	229,670	100
YORK	124,070	82.45	26,405	17.55	150,485	100
GTA TOTAL	877,295	59.00	609,965	41.00	1,487,265	100

Source: Statistics Canada, Profiles, 1991.

TABLE 4.14
PERCENTAGE HOUSEHOLD TYPES: GREATER TORONTO AREA - 1991

REGION	Single Family	%	Semi/Town Row	%	Low-Rise	%	High-Rise	%	Total Region	%
METRO TORONTO	281,475	33.2	156,440	18.1	110,695	12.8	309,940	35.8	864,555	99.9
DURHAM	94,005	69.0	22,130	16.3	9,255	6.8	10,750	7.9	136,140	100.0
HALTON	69,860	65.6	15,735	14.8	5,155	4.8	15,665	14.7	106,420	99.9
PEEL	113,425	49.4	53,165	23.1	9,510	4.1	53,570	23.3	229,670	99.9
YORK	120,145	79.8	13,800	9.2	5,150	3.4	11,395	7.6	150,490	100.0
GTA TOTAL	678,910	45.7	261,270	17.6	139,765	9.4	401,320	27.0	1,487,275	99.7

Note: Statistics Canada - Cat. No 95-337, 1991 Census - 100% Data

GTA Housing Projections

Over the planning period for the GTA 3Rs Analysis, there is expected to be considerable variation in the rate and type of new housing constructed in the GTA. For example, Tables 4.15 and 4.16 indicate that the rate of growth of new housing in Metro Toronto is expected to level off, with much of the newer housing being multiple family, infill development. This type of housing construction is due primarily to the low amount of "green field" development land in Metro Toronto and Provincial housing initiatives. The Regional Municipalities are expected to experience growth of all housing types. By 2015, the GTA is predicted to have 2,301,432 units, representing a 66% increase of the current housing stock.

Several additional current and future trends include:

- Toronto Census Metropolitan Area is no longer the tightest rental housing market in Canada;
- there is very little ongoing private rental construction but the assisted rental construction component of the market has increased dramatically;
- singles, semi's and freehold townhouses dominate housing starts in Toronto CMA;
- housing demand in the Toronto area is expected to be weak over the next few years due to lower household formation rates. In the late 1990s home ownership is expected to increase (CMHC);
- over the longer term, the rate of household growth in the GTA is expected to decline due to lower levels of net migration and the aging of the population out of the prime household formation stage; and
- shortages of developable land is expected to result in net zero growth of single-detached dwellings in Metro Toronto by the year 2000. Over the long-term, non-Metro Toronto regions are also expected to experience a decline in household growth.

TABLE 4.15
HOUSEHOLD PROJECTIONS BY REGION

YEAR	Metro Toronto	Durham	Halton	Peel	York	GTA
1991	858,550	136,140	106,420	229,670	150,485	1,487,265
1992	871,880	147,105	109,301	240,228	161,556	1,530,070
1993	879,267	153,120	112,261	250,582	169,129	1,564,359
1994	886,717	159,155	115,301	261,383	177,057	1,599,613
1995	894,229	165,210	118,424	272,649	185,357	1,635,869
1996	901,806	171,290	121,630	284,400	194,046	1,673,172
1997	909,447	177,390	124,924	293,392	199,985	1,705,138
1998	917,152	183,520	128,307	302,669	206,107	1,737,755
1999	924,923	189,670	131,782	312,238	212,416	1,771,029
2000	932,760	195,845	135,350	322,111	218,918	1,804,984
2001	940,663	202,040	139,016	332,295	225,619	1,839,634
2002	946,916	208,265	142,914	340,788	231,400	1,870,283
2003	953,212	214,725	146,921	349,497	237,329	1,901,684
2004	959,549	221,210	151,041	358,430	243,410	1,933,640
2005	965,929	227,720	155,277	367,590	249,646	1,966,162
2006	972,351	234,255	159,631	376,985	256,043	1,999,265
2007	978,815	240,825	164,107	384,928	261,961	2,030,636
2008	985,323	247,420	168,709	393,039	268,016	2,062,507
2009	991,874	254,045	173,440	401,320	274,212	2,094,891
2010	998,468	260,905	178,304	409,776	280,550	2,128,003
2011	1,005,000	267,795	183,304	418,410	287,036	2,161,545
2012	1,011,788	274,710	188,444	427,226	293,671	2,195,839
2013	1,018,515	281,620	193,728	436,228	300,459	2,230,550
2014	1,025,287	288,485	199,161	445,419	307,404	2,265,756
2015	1,032,103	295,270	204,745	454,804	314,510	2,301,432

Source: OGTA; Hardy Stevenson and Associates

TABLE 4.16
HOUSEHOLD PROJECTIONS BY TYPE

District	Housing Type	1986	1991	1996	2001	2006	2011	2015
Metro Toronto		827,492	858,550	901,806	940,663	972,351	1,005,106	1,032,103
	Single Det.	258,403	287,475	-	295,474	-	295,474	-
	Semi/Row/Town	194,774	156,440	-	290,801	-	307,712	-
	Low Rise	86,579	110,695	-	-	-	-	-
	High Rise	287,736	309,940	-	354,388	-	401,920	-
Durham		106,655	136,140	171,290	202,040	234,255	267,795	295,270
	Single Det.	71,070	94,005	118,408	139,717	160,987	182,093	199,026
	Semi/Row/Town	26,330	22,130	37,708	44,033	50,950	58,122	63,846
	Low Rise	-	9,255	-	-	-	-	-
	High Rise	9,255	10,750	15,174	18,290	22,318	27,580	32,398
Halton		89,825	106,420	121,630	139,016	159,631	183,304	204,745
	Single Det.	58,825	69,860	-	91,290	-	119,294	-
	Semi/Row/Town	17,275	15,735	-	27,908	-	38,700	-
	Low Rise	-	5,155	-	-	-	-	-
	High Rise	13,725	15,665	-	19,818	-	25,310	-
Peel		186,715	229,670	284,400	332,295	376,985	418,410	454,804
	Single Det.	86,910	113,425	-	155,608	-	183,612	-
	Semi/Row/Town	56,885	53,165	-	83,994	-	100,202	-
	Low Rise	-	9,510	-	-	-	-	-
	High Rise	42,920	53,570	-	69,713	-	89,824	-
York		105,195	150,490	194,046	225,619	256,043	287,036	314,510
	Single Det.	84,740	120,145	144,096	166,283	188,232	210,366	229,996
	Semi/Row/Town	10,615	13,800	19,193	21,952	24,397	26,674	28,805
	Low Rise	4,340	5,150	-	-	-	-	-
	High Rise	5,500	11,395	30,757	37,384	43,414	49,996	57,273
GTA		1,315,882	1,481,265	1,615,306	1,816,654	1,962,239	2,116,879	2,301,432
	Single	559,948	678,910	-	848,372	-	990,839	-
	Semi/Row/Town	305,879	261,270	-	468,688	-	531,410	-
	Low Rise	90,919	139,765	-	-	-	-	-
	High Rise	359,136	401,320	-	499,593	-	594,630	-

Source: Selected Characteristics for Census Divisions and Census Subdivisions, 1986 Census - 100% Data

Employment

Table 4.17 shows employment projections for the Regional Municipalities of the GTA. All employment estimates must be viewed with some caution, given job losses during the recession.

Table 4.17 indicates that, in 1991, the GTA provided approximately 2,419,455 employment opportunities. About 60% of the jobs in the GTA were located in Metro Toronto. Peel Region provided the next largest number of jobs at 16.3%. Halton Region provided the fewest employment opportunities, at 6.2%. Based on Hemson projections, Peel and York Region are anticipated to experience major gains in employment with Peel accommodating 24% of the employment increase in the GTA and York accommodating 25% of the employment growth to 2011. Durham and Halton will experience a 13% and 11% change, respectively.

The overall trends in the GTA are for increases in service and office type employment. Since 1981, manufacturing and commercial services have experienced the most significant decreases in employment opportunities. Similarly, labour force declines across the GTA have been greatest in the manufacturing sector.

Employment in the GTA continues to be dominated by manufacturing at 21.5% of the employment opportunities. However, both the office sectors and service sectors provide considerable employment opportunities in the GTA. Within these sectors, Durham Region has the highest dependence on manufacturing; Halton Region has the highest percentage dependence on finance, insurance and real estate.

Several trends are apparent with respect to future employment growth[1]:

- increasing female workforce participation rates will occur in the 35 - 65 age groups and will play a major role in the future growth of employment;
- Metro Toronto's share of employment growth will be low and decreasing, and over the long-term, will account for 50% of the employment opportunities;

[1] Hemson Consulting Ltd., Employment Forecasts for the Greater Toronto Area to 2031. October, 1989.

TABLE 4.17
EMPLOYMENT PROJECTIONS BY REGION

YEAR	Metro Toronto	Durham	Halton	Peel	York	GTA Total
1986	1,349,000	137,264	119,000	304,000	170,000	2,079,264
1987	1,368,998	143,507	124,639	320,182	183,778	2,141,104
1988	1,389,293	150,035	130,546	337,227	198,673	2,205,774
1989	1,409,888	156,860	136,733	355,178	241,775	2,300,434
1990	1,430,789	163,995	143,213	374,086	232,182	2,344,265
1991	1,452,000	171,455	150,000	394,000	252,000	2,419,455
1992	1,464,504	176,609	154,223	404,695	261,654	2,461,685
1993	1,477,116	181,919	158,565	415,679	271,678	2,504,957
1994	1,489,836	187,388	163,029	426,962	282,085	2,549,300
1995	1,502,666	193,021	167,618	438,552	292,892	2,594,749
1996	1,515,607	198,824	172,337	450,455	304,112	2,641,335
1997	1,528,659	204,802	177,189	462,682	315,762	2,689,094
1998	1,541,823	210,959	182,177	475,241	327,859	2,729,059
1999	1,555,101	217,301	187,306	488,141	340,419	2,788,268
2000	1,568,493	223,834	192,579	510,391	353,460	2,848,757
2001	1,582,000	230,564	198,000	515,000	367,000	2,892,564
2002	1,592,104	235,117	202,180	522,314	375,906	2,927,621
2003	1,602,273	239,761	206,448	529,733	385,027	2,963,242
2004	1,612,507	244,496	210,806	537,256	394,370	2,999,435
2005	1,622,807	249,325	215,256	544,887	403,940	3,036,215
2006	1,633,172	254,249	219,800	552,626	413,742	3,073,589
2007	1,643,603	259,270	224,440	560,474	421,560	3,109,347
2008	1,654,102	264,391	229,178	568,435	429,525	3,145,631
2009	1,664,667	269,613	234,016	576,508	437,641	3,182,445
2010	1,675,299	274,938	238,956	584,696	445,910	3,219,799
2011	1,686,000	280,368	244,000	593,000	454,335	3,257,703
2012	1,696,769	283,142	249,151	601,422	459,360	3,289,844
2013	1,707,606	285,944	254,411	609,964	464,440	3,322,365
2014	1,718,513	288,773	259,781	618,627	469,576	3,355,270
2015	1,729,490	291,631	265,265	627,414	474,769	3,388,569

Source: OGTA; Hardy Stevenson and Associates

- Most of Metro Toronto's growth will occur in the office sector;

- the Regions (vs. Metro Toronto) will continue to attract a growing share of future GTA employment and Peel and York will accommodate half of the future growth; and

- Halton and Durham will gradually increase employment levels with more growth occurring over the longer term. A small proportion of the growth is expected from office employment.

A second analysis of future employment levels and distribution was completed by the IBI Group in their GTA, Urban Structure Concepts Study (1990a). They assumed a number of societal trends affecting employment (IBI, 1990a, pp. 10-11), including:

- continuing rapid entry of women into the out-of-home labour force, but at reduced rates relative to the last two decades;

- continuing rates of household formation until the turn of the century as the remainder of the baby boom generation enters the real estate market;

- an increasing number of retired persons living in the community, particularly following 2011 as the baby boom generation starts to reach retirement age; and

- an increase in the overall participation rate between 1986 and 2011, followed by a decline to an intermediate level by 2021. Across the GTA participation rates ranged from 70.6% in Metro to 77.3% for Peel. Male participation rates in each Region varied between 79 to 87% and female participation varied between 60 to 68%.

As part of the City of Toronto Official Plan Review, Analytic Information Management Inc. (AIMI) assessed the GTCC employment estimates (City of Toronto, 1990). This study conducted jointly with the University of Toronto using the PRISM model assessed potential employment changes in the GTA using the Census Metro Toronto Area[2] (CMA) as a base. In contrast to the Hemson projections, AIMI notes several employment trends relevant to this study:

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[2] The Toronto CMA encompasses Metropolitan Toronto, Peel and York Region, all of Halton except Burlington and a small part of Durham, not including Oshawa and Whitby.

- labour force participation rates will level off; and

- an aging workforce will increase the demand for consumer services (especially in the leisure market area) relative to spending on housing and "necessary" consumer durables.

As part of the context for the Metro Toronto Strategic Plan and the development of policies for the new Metro Toronto Official Plan, the Metro Toronto Planning Department completed an analysis of the magnitude and distribution of future population and employment activities within Metro Toronto and the GTA. The analysis identified several employment trends relevant to the 3Rs analysis:

- the distribution of jobs by activity have shifted such that goods producing activities have experienced a decline while service activities have increased;

- it is assumed that Metro Toronto's long-term employment will shift from industrial (manufacturing and wholesale) activities to offices; and

- shares of employment in other sectors are expected to remain relatively stable.

More recently, employment in the GTA has declined considerably. The Canada Mortgage and Housing Corporation (CMHC) has estimated that employment in the Toronto CMA has declined by 10% (200,000 jobs) with manufacturing and construction experiencing significant decline (CMHC, 1993a). Service industries have remained stable during the recession, although there are potential jobs losses as a result of restructuring in the financial services, transportation, utilities and public administration sectors.

The GTA will also be influenced by the further automation of jobs and loss of traditional manufacturing jobs. A significant trend will be the continued emergence of a bi-polar service sector of:

1) highly rewarded educated management and professional service sector;
2) disproportionate number of workers in lower paying jobs, poor backgrounds and under-educated workforce.

4.3.2 Durham Region (Social Environment)

Demographic Characteristics

In 1991, Durham had about 10% of the population in the GTA with 409,070 residents. As seen on Table 4.5, the most populated centre in Durham Region is Oshawa followed by Pickering and Whitby.

Due to most of the land in Metro Toronto being developed, Durham Region is expected to experience higher growth rates than Metro Toronto, but less than York and Peel Regions. Table 4.6 indicated that Durham was expected to receive 21% of the growth of the GTA between 1991 and 2011 and 20% of the growth of the GTA in the 2011 to 2031 period. York and Peel will continue to be the fastest growing municipalities over that period.

By 2015, Durham Region is expected to have 781,000 residents, roughly the size of Peel Region today. The population projections selected for Durham Region and other Regions within the GTA were presented in Table 4.7, Population Projections by Region.

Durham Region is linguistically the most homogenous region in the GTA with almost 90% of the population indicating English as their mother tongue (see Table 4.8).

As seen on Table 4.9, Durham Region has a younger population and consequently, higher fertility rate. The remainder of the age groups in the Region are about average for the GTA. Over the planning period, most of the growth in Durham Region will be driven by immigration (as opposed to birth rate, rate of family formations etc). Table 4.10 indicates that the median age for Durham residents will also resemble the average median age for the GTA.

Durham Region had the lowest average income of households of all Regions in the GTA. Given this, residential waste diversion scenarios involving additional household costs may be less effective.

Housing

In 1991, Durham had 136,135 households, as indicated on Table 4.12. Consistent with population data, the majority of households are located in Oshawa followed by Pickering, Whitby and Ajax. Table 4.13 indicates that about 25% of the housing units in Durham are rental units. This number of rental units is significantly less than Metro Toronto but more than York Region (17 %), the Regional Municipality with the least housing units.

CMHC reports that Durham municipalities are currently experiencing the highest rental vacancy rates in the GTA and the highest vacancies since they began surveying.

By 2015, as indicated on Table 4.15, Durham is expected to have approximately 295,000 households, more than a doubling from 1991. Average household sizes are expected to decline to 2.48 persons per household in 2031.

Single family housing dominates Durham Region's housing mix at 69% of the housing in the Region. Due to preferences of an aging population for high-rise and multiple family dwellings, these housing forms are expected to increase in the 1990s. Based on Clayton household projections, Durham Region is expected to have a considerable increase in single family housing units over the planning period. Most of the multiple family units in Durham are semi-detached, rows and townhouses (52.5%), 21.9% are high-rises; 25.5% are low-rises. Table 4.14 indicates that a proportion of all housing units, 7.9% are high-rises and 6.8% low-rises.

Employment

On a percentage basis, Durham has had considerably greater employment growth than Metro Toronto, although jobs have not been created at the same rate as in York and Peel Regions. In 1986, Durham Region had a labour force of 175,000 people. As with the other Regions, Durham is expected to experience increasing participation of females in the 35 to 65 age bracket.

As indicated on Table 4.17, Durham is expected to have 291,631 jobs by 2015. And overall, Durham will continue to attract employment growth in GTA but not as rapidly as Peel and York Regions. The majority of Durham's labour force is employed in manufacturing and other service sectors. In contrast, Metro Toronto's labour force has a lesser percent of people in manufacturing and more people in the service sector and finance, insurance and real estate.

Since 1981, Durham's employment base has shifted with a dominant change being a decline in the Primary and Manufacturing IC&I sectors. Durham has seen an increase in the Wholesale and Commercial Services Sectors. These trends are expected to continue, reflecting broad employment shifts across the GTA.

Compared to local employment characteristics, the Durham labour force is characterized by more people involved in transportation, communications and utilities and the office sector.

4.3.3 Metro Toronto (Social Environment)

Demographic Trends

With a 1992 population of 2.27 million people, Metro Toronto is the largest jurisdiction within the GTA. Population levels indicated on Table 4.5 represent 53.7% of the population of the GTA. In terms of growth trends, there will be considerably less and slower growth in Metro Toronto compared to the GTA Regions. Table 4.5 indicates that Metro Toronto is expected to absorb only 8% of the growth in the GTA due to declining birth rates and little greenfield lands left for development. However, Metro Toronto's growth rate is expected to rise after 2011 due to redevelopment.

Table 4.7 indicated that Metro Toronto is targeted for a long-term growth target of 2.5 million people with most of the growth driven by immigration. As reflected by 1991 Census data on mother tongue, for example, Metro Toronto has the most diverse language make-up followed by Peel and York Regions. Table 4.8 indicated that the dominant language in Metro Toronto is English at 64.2% of the population. With 17.1% of the residents speaking other languages, Metro Toronto has the most diverse language make-up of all Regions in the GTA, higher than the GTA average of 13.5 %. The fastest growing Metro Toronto language groups are Chinese with both English and Italian experiencing declines.

Other language and cultural trends in Metro Toronto include: immigration dominated by people who do not have a functional command of English and of people from Asia, the Caribbean, Latin America, Poland and Portugal.

Metro Toronto's population is aging, reflecting a general aging trend across the GTA. As shown on Table 4.10, Metro Toronto had a median age of 31.5 for males (1986 Ontario average was 31.4) and 33.9 for females (1986 Ontario average was 33.1). Thus, Metro Toronto reflected the median age for Ontario. The median age of Metro Toronto, however, is expected to rise to 41.9 for males (2011 Ontario average will be 39.7) and 45.6 females (2011 Ontario average will be 42.7) to the year 2011. Thus, Metro Toronto is expected to have an increasingly older population than the Ontario average.

As seen on Table 4.9, within the GTA Metro Toronto has the fewest people under the age of 19 (22.4%) and the highest number of people over 65 years of age at 12.8% Overall, there will be a rise in the percentage of retired persons as baby boomers retire over the planning period. Family characteristics in Metro Toronto are similar to those of the GTA and include a reduction in the number of children per family; increased divorce rates; and people marrying at a later age.

From 1981 to 1986, Table 4.11 indicates that Metro Toronto continued to be the second lowest income Region with an average household income of $40,493. Residents of Halton, Peel and York Regions all have higher (average) incomes than Metro Toronto residents. Other income trends include:

- continued slide of disposable income;
- double income families as norm;
- continued income stress;
- shift toward time and convenience; and
- feminization of poverty, along race and ethnic grounds.

To address changing demographic characteristics in Metro Toronto, local municipalities have begun to shift municipal service provision to community health, leisure, recreation, senior support services. Trends toward integration of municipal services may also be effective in the implementation of GTA 3Rs waste diversion activities.

Housing

Table 4.12 indicated that, in 1992 Metro Toronto had 864,555 households representing 58% of the GTA households. It is expected that there will be continuing rates of household formation due to the baby boom blip entering housing market. By 2015, Metro Toronto is expected to 1,032,103 housing units, as presented on Table 4.15. However, many of the units will be over 65 to 70 years old and will be undergoing renovation.

In 1991, Metro Toronto had 449,105 rental housing units, representing 74% of all of the rental housing units in the Greater Toronto Area. As seen on Table 4.13, Metro Toronto also had more rental housing units than freehold units, representing the highest percent of rental units in the GTA.

Table 4.14 indicated that Metro Toronto's housing make-up is heavily represented by high-rise at 35.8% and multiple family units at 48.6% (low-rise and high-rise combined). Metro Toronto has the highest number, but lowest percentage of single family dwellings at 33.2%. There is no major difference in household size within Metro Toronto, about 2.6 pph (see Table 4.12). However, Metro Toronto has more single family and 2 person households than the Regions, likely reflecting the median age of residents. Over the GTA 3Rs planning period, it is expected that there will be an increased desire for medium density and high-rise housing due to an aging population desiring less property responsibility.

Over the planning period, it is anticipated that Metro Toronto will also experience an increase in households due to infilling and redevelopment. However, Metro Toronto will capture fewer of the housing units compared to other GTA regions.

Employment

In 1992, Metro Toronto provided 1.23 million job opportunities, representing 60% of the job opportunities in the GTA and a growth of 14% since 1981. Table 4.17 indicates that Metro Toronto employs the most workers in the GTA and is expected to do so to the year 2015. At that time, Metro Toronto is expected to be able to provide 1,729,490 employment opportunities.

In terms of type of employment, Metro Toronto is the highest employer in the finance, insurance and real estate sectors (FIRE), at 27.1% of total employment. The next dominant source of employment is the service sector. With commercial and non-commercial services combined, the service industry is the major employer in Metro Toronto at 28% followed by FIRE. Compared to the rest of the GTA, Metro Toronto had a smaller percentage of manufacturing and a greater proportion of employment in the finance, insurance and real estate sector.

Only two areas have experienced employment growth since 1981, wholesale and finance, insurance and real estate. Manufacturing, transportation and retail industries have experienced significant declines.

In 1986, Metro Toronto's labour force was 1.26 million. In contrast to the employment opportunities, the service sector continues to employ most Metro Toronto residents (34.2%), representing an increase from 1981 to 1986. However, a significantly higher percentage of the labour force is employed in manufacturing than other employment areas.

In the future, its expected that there will be pressure to shift Metro Toronto's jobs to two categories: low pay, low skill, part-time; and high pay, high skill, full time.

Other trends predicted are that Metro Toronto will increasingly lose its attractiveness as a place to look for work compared to the Regions. Growth will be low and account for only 50% of the GTA employment opportunities. Most Metro Toronto growth will occur in the Office Sector. The highest labour force growth will be female, 35-65 age bracket. In addition, the overall participation rate in the labour force will increase but gradually level off.

4.3.4 York Region (Social Environment)

Demographics

Table 4.5 indicated that York Region was the third largest Regional Municipality in the GTA behind Metro Toronto and Peel Region. At 504,981 residents York Region has 11.9% of the population of the GTA, with Markham and Vaughan being the largest municipalities in the Region. In 1988, 80% of York Region's residents lived in urban centres, 11.5% lived in rural centres and 8.5% lived in rural areas.

In the 1981 to 1986 period, York was the second fastest growing municipality, behind Peel. Within the GTA, York Region and the other Regional Municipalities are expected to absorb significantly greater growth than Metro Toronto over the GTA 3Rs planning period. Both Peel and York Regions are expected to grow fastest. By 2011, as seen on Table 4.6, Durham, York and Peel are anticipated to capture approximately 77% of the growth in the GTA, with York expected to be the fastest growing of all Regions. By the end of the GTA 3Rs planning period, York is expected to have 889,726 residents.

In terms of cultural diversity, York Region is similar to Peel Region and close to the average of language groups in the GTA, as seen on Table 4.8. For example, about 73.3% of York Region residents have English as their mother tongue compared to 71% of the GTA. York Region has the higher percentage of Italian speaking residents and a higher percentage of Chinese speaking residents. Both of these groups have grown proportionally to other groups over the last five years.

York Region has the highest percent of young people in the 0-15 years age category; the highest percent of people in the 35-54 age category. Table 4.9 indicates that, compared to Metro Toronto, at 12.8%, York Region has relatively fewer people over the age of 65 (7.0%). In 1987, Table 4.10 indicates that York Region had a Median Age of 29.7 for males (1986 Ontario average was 31.4) and 30.4 for females (1986 Ontario average was 33.1). This is expected to rise to 34.7 (2011 Ontario average will be 42.7) and 36.3 (2011 Ontario average will be 39.7) % to the year 2011. Overall, the Region will continue to have a younger population than the rest of the GTA over the long term.

Across the GTA, children and teenagers are expected to increasingly be raised in single-parent family households or blended family households (Canadian Urban Institute, 1991b). A growing proportion of families will be two income families, thus potentially reducing the time available for waste diversion activities. Many other services providers in the GTA have moved toward rationalizing and integrating community-based services and facilities through future community hub-centres (e.g. based in school buildings).

Table 4.11 indicates that York Region has the highest average incomes of all Regions in the GTA for both 1981 and 1986.

Housing

As of 1991, York Region had 150,485 households with the largest number of households being located in Markham (Table 4.12). York Region households are expected to increase to 314,510 by 2015. At 3.3 persons per household, York Region also has the highest number of people per household of all Regions in the GTA. Of all GTA Regions, York also has the highest rate of home ownership (82.5) and at lowest rate of rental housing at 17.6%.

Table 4.16 indicates that 80% of York Regions homes are single family dwellings; 9.1% are semi-detached, rowhousing and townhouses; 3.4% low-rise and 7.6% high-rise. By way of comparison, 42.6% of the GTA is single family dwellings and 27.3 of the housing is high-rise.

Due to preferences for an aging population to desire high-rise and multiple family dwellings, these housing types are expected to increase in the 1990s. Based on Table 4.16, the amount of higher density housing in York Region will increase to just over 18% of the housing stock toward the end of the planning period.

Employment

York Region provides 261,653 of the GTA's employment opportunities, or 10.8% of the jobs in the GTA. Since 1981, York Region had the greatest job growth in the GTA. As shown on Table 4.17, the Region is expected to provide 474,769 jobs by the year 2015.

York Region's 14,625 firms are more broadly focused compared to other Regions. At 26.4%, manufacturing is the largest employer followed by wholesale services at 15.8% and commercial services at 13.8%. Since 1981, York Region has seen a decline in primary industries (agriculture), transportation, public administration and retail services. Areas of significant increase are construction and wholesale services. York Region has considerably lower finance, insurance and real estate functions than the rest of the GTA.

In contrast to employment, the service sector employs over 30% of the Region's residents followed by the wholesale sector at 20.3% and manufacturing at 19.5%.

4.3.5 Peel Region (Social Environment)

Demographics

Behind Metro Toronto, Peel Region is the second most populated Region, with 732,798 residents in 1991. As indicated on Table 4.5, over 63% of Peel's residents are located in Mississauga. Table 4.6 indicated that both Peel and York Regions are expected to grow the fastest over the GTA 3Rs planning period. Like York Region, Peel has experienced more than double the growth rate of Metro Toronto.

Population projections for Peel indicate that by 2015, the region is expected to have 1,173,500 residents. This will be consistent with the expectation that the Regions outside of Metro will absorb most of the future growth of the GTA.

By language, English is still the largest language group, however as indicated on Table 4.8, the frequency of English as a mother tongue had declined by 1991 to 72.7%. The second major language group is Italian (3.8%) followed by Portuguese (3.2%). The two fastest growing language categories are Chinese and Polish.

Compared to other Regions in the GTA, Peel Region has a higher Italian and Chinese population (by mother tongue) and the diversity of other language groups mirrors the diversity of the GTA.

As indicated on Table 4.9, Peel Region has proportionally more children (30.0%) than the GTA overall (26.0%). Along with Durham Region, Peel has a low percentage of older people with 7% being between the ages of 55 and 64 and 6.4% over 65 years of age compared to 8.8% and 10.3% respectively for the GTA.

Peel Region residents have household incomes that are average compared to the other Regions, with Table 4.11 indicating 1986 average household incomes of $46,630.

Housing

In 1991, Peel Region had 233,070 households. As indicated on Table 4.12, most of the households are located in Mississauga. Peel Region has more people per household compared to other Regions, reflecting younger families and extended family structures associated with some of Peel's cultural groups.

At 68.3%, Table 4.13 indicates that Peel Region has the second lowest rate of home ownership (31.6% rental) for the GTA Regions. While Table 4.14 indicates that the majority of Peel's dwellings are single detached, although Peel Region also has the highest percent of semi's, townhomes and row housing. The Region also has a higher proportion of high-rises, at 23.3%.

Peel is expected to have 454,804 households by the year 2015, making it the second largest municipality next to behind Metro Toronto, as indicated on Table 4.15. The robust household growth expected over the planning period will include a doubling of the numbers of single family detached and high-rise dwellings.

Employment

Peel Region employment (jobs based in Peel Region) currently stands at 404,695 jobs represented by 15,494 employment establishments (1992 est.). While Peel Region is a distant second to Metro Toronto in terms of employment opportunities in the GTA, it has alomost twice the number of jobs in Durham and Halton Region. Most of Peel's employment growth from 1981 to 1992 has been in the manufacturing and wholesale sectors. Peel has experienced employment losses in the transportation, retail and public administration sectors over the same time period.

The number of employees is expected to increase to 627,400 jobs by the year 2015 as indicated on Table 4.17. By the year 2015, both York and Peel Regions are expected to offer considerable employment opportunities within the GTA. Peel is expected to capture 24% and York Region an additional 25% of the employment growth in the Greater Toronto Area, while Metro Toronto's share of employment growth will be decreasing.

Labour force data (employed residents who may work in Peel or elsewhere) indicates the sectors in which Peel residents work. Peel Region had a labour force of 333,650 in 1986. However, it is expected that Peel's labour force has declined from these levels due to the recession and Peel residents being more dependent on manufacturing employment opportunities. Labour force employment in manufacturing and has increased considerably in the commercial service sector since 1981.

5.0 WASTE DIVERSION IN THE GTA

This chapter discusses the current state of waste diversion in the GTA. It begins with an examination of waste quantities and composition for each of the Regional municipalities. This is followed by a description of the Existing and Existing/Committed systems for each of the Regions. The chapter concludes with a summary discussion on markets for secondary materials, waste export and import, and future waste composition trends.

5.1 Waste Generation Quantities and Composition

The following describes residential waste quantities and compositions for each of the Regional municipalities and IC&I waste quantities and composition for the GTA as a whole. More detailed data are presented in the Service Technical Appendix and are summarized by Region in this section. The composition of disposed waste is estimated by determining the composition of generated waste and then subtracting the composition of waste diverted to estimate the composition of disposed waste. This procedure is carried out separately for residential and IC&I wastes. The methodology by which waste composition estimates were developed is described in the Service Technical Appendix.

5.1.1 Durham Residential

Historical data on waste generation and management in Durham Region is presented in Table 5.1. Residential waste generation in Durham Region is estimated to average 330 kg/capita/year, for 1986 to 1992.

Projections for residential waste generation in Durham Region, from 1993 to the year 2015 are presented in Table 5.2. These were developed on the basis of a per capita generation rate of 330 kg/year. Any source reduction anticipated in this rate is addressed separately.

The residential waste generated in Durham Region in 1992 is estimated to have the following composition:

- 16% newspaper;
- 18% other paper;
- 5% glass;
- 4% tinplate steel;

Table 5.1

Waste Generation & Management in Durham
1986-1992

Year	Population	Residential Generation (Tonnes)	Residential Generation Rate (T/Cap/Yr)	Residential Diversion Rate %	RESIDENTIAL DIVERSION (Tonnes): Total Residential Diversion	Green Waste	Backyard Compost	Blue Box	Igloo & Container	Other	WASTE LANDFILLED: Residential (Durham #s) (Tonnes)	IC&I (by differ.) (Tonnes)	Total (Metro #s) (Tonnes)	*As reported by Durham (Tonnes)*
1986	326,179	*101,115*	*0.31*	0.00	0						101,115	152,125	253,240	
1987	340,570	104,634	0.31	4.35	4,550					4,550	100,084	161,826	261,910	*215,479*
1988	347,837	112,036	0.32	10.68	11,970			11,970			100,066	190,509	290,575	*207,957*
1989	385,480	126,049	0.33	15.82	19,939	2,274		16,087		1,578	106,110	189,353	295,463	*225,070*
1990	397,540	132,587	0.33	18.77	24,890	2,100	525	20,459	1,788	18	107,697	190,264	297,962	*240,364*
1991	409,075	137,815	0.34	22.92	31,590	2,214	3,121	20,841	810	4,604	106,225	118,694	224,919	*183,922*
1992	422,825	141,672	0.34	27.23	38,581	8,045	5,388	17,166	2,077	5,905	103,091	62,615	165,706	*121,573*
		Average =	*0.33 (excl. 1986)*											

Notes:

1) Population data supplied by Hardy Stevenson & Associates.
2) Actual diversion numbers were given for January - June 1992; therefore, all numbers have been multiplied by 2
3) OMMRI numbers used for Blue Box diversion estimates for 1990 and 1991.
4) The 1987 residential generation rate was applied to the 1986 total waste generated to calculate residential waste generated for 1986.
5) Other diversion includes 613.5 tonnes of recyclables from transfer stations

Assumptions:

- Landfill numbers for Durham, as reported by Metro, are assumed to be correct.
- the discrepancy between Region of Durham landfill numbers and Metro landfill numbers is due to loads delivered by haulers not on Durham's approved list.
- the residential quantities reported by Durham are assumed to be correct The difference between Durham and Metro numbers is assumed to be IC&I waste
- the Blue Box Program began in 1988.

Table 5.2

Preliminary Waste Generation Forecast
Durham Region

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	Industrial & Commercial Waste (Tonnes) (4)	Total Generation (Tonnes) (5)
1993	438,380	144,665	181,919	205,568	350,234
1994	453,880	149,780	187,388	211,748	361,529
1995	469,335	154,881	193,021	218,114	372,994
1996	484,745	159,966	198,824	224,671	384,637
1997	500,120	165,040	204,802	231,426	396,466
1998	515,450	170,099	210,959	238,384	408,482
1999	530,750	175,148	217,301	245,550	420,698
2000	546,005	180,182	223,834	252,932	433,114
2001	561,230	185,206	230,564	260,537	445,743
2002	576,425	190,220	235,117	265,682	455,902
2003	592,125	195,401	239,761	270,930	466,331
2004	607,790	200,571	244,496	276,280	476,851
2005	623,420	205,729	249,325	281,737	487,466
2006	639,025	210,878	254,249	287,301	498,180
2007	654,600	216,018	259,270	292,975	508,993
2008	670,160	221,153	264,391	298,762	519,915
2009	685,690	226,278	269,613	304,663	530,940
2010	701,740	231,574	274,938	310,680	542,254
2011	717,780	236,867	280,368	316,816	553,683
2012	733,770	242,144	283,142	319,950	562,095
2013	749,695	247,399	285,944	323,117	570,516
2014	765,465	252,603	288,773	326,313	578,917
2015	781,045	257,745	291,631	329,543	587,288

Notes:

(1) Population data from Clayton Research Associates Ltd., Hardy Stevenson and Associates (Feb/93).

(2) Population projection multiplied by 0.33 tonnes/capita/year (based on historical data)

(3) Employment data supplied by Hardy Stevenson & Ass., GTA 3Rs Analysis, Social Impact Assessment Technical Document, Prepared For MOEE, Mar.26/93

(4) Number of employees (col. 3) multiplied by 1.13 tonnes/employee/year (based on 1987 data)

(5) Column 2 plus Column 4

- 1% aluminum;
- 6% plastic;
- 22% food;
- 16% yard waste;
- 3% disposable diapers; and
- 10% other materials.

These values were developed using residential waste composition data from studies carried out in East York in 1989 (Residential Waste Composition Study Volume I of the Ontario Waste Composition Study, Gore and Storrie Ltd., January 1991). These were considered the most appropriate waste composition data to apply to GTA municipalities for reasons outlined in the Service Technical Appendix. As 3,451 tonnes (9%) of the total residential waste stream recycled in 1992 was described as "other" material, diversion rates by material could not be estimated for each material category presented in the generation estimates. Based on the available data, the disposed residential waste stream consisted of the following categories in 1992:

- 10% newspapers;
- 24% other papers;
- 3% glass;
- 3% metal;
- 8% plastic;
- 40% food and yard waste; and
- 13% other materials.

These disposed residential waste composition data are presented in Figure 5.1.

5.1.2 Metro Toronto Residential

Historical data on waste generation and management in Metro Toronto is presented in Table 5.3. Residential waste generation (which includes some commercial waste and waste from municipal facilities (i.e. parks) which cannot be separated out of the reported totals) in Metro Toronto is estimated to average 480 kg/cap/year.

Projections for residential waste generation in Metro Toronto, from 1993 to the year 2015 are presented in Table 5.4. These were developed on the basis of a per capita generation rate of 480 kg/year. Any source reduction anticipated in this rate is addressed separately.

Figure 5.1

Composition of Disposed Residential Waste
Region of Durham

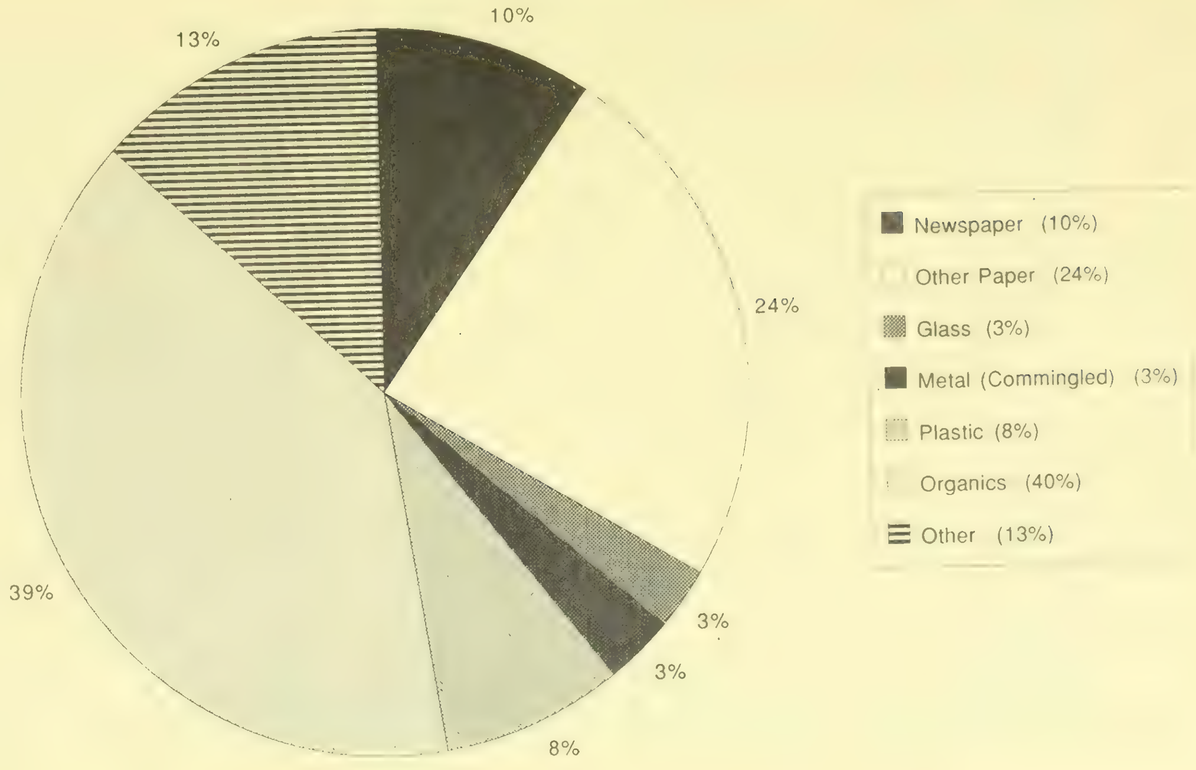


Table 5.3

Waste Generation & Management in Metro Toronto
1986-1992

Year	Population	Residential Generation (Tonnes)	Residential Generation Rate (T/Cap/Yr)	Residential Diversion Rate %	RESIDENTIAL DIVERSION (Tonnes): Total Residential Diversion	Green Waste	Backyard Compost	Blue Box	Igloo & Container	Other	WASTE LANDFILLED: Residential (Tonnes)	IC&I (Tonnes)	Total (Tonnes)
1986	2,175,900	1,007,243	0.46	0.00	0						1,007,243	1,445,857	2,453,100
1987	2,125,520	1,021,576	0.48	2.11	21,554	4,639		16,915			1,000,022	1,490,098	2,490,120
1988	2,133,559	1,028,254	0.48	3.85	39,592	13,537		26,055			988,662	1,405,066	2,393,728
1989	2,130,855	1,060,206	0.50	8.00	84,821	22,241		62,580			975,385	1,241,573	2,216,958
1990	2,137,204	1,056,072	0.49	10.67	112,640	27,082	9,980	75,065		513	943,432	1,169,697	2,113,129
1991	2,275,800	1,015,417	0.45	16.40	166,494	56,445	16,660	85,054		8,335	848,923	704,492	1,553,415
1992	2,298,031	1,077,245	0.47	19.37	208,632	71,062	25,200	99,671	2,611	10,088	868,613	200,015	1,068,628
		Average =	0.48										

Notes:

1) Population data supplied by Hardy Stevenson and Associates (Feb/93)
2) Green waste includes leaves, yard waste & Xmas trees
3) Residential waste is "Municipal waste" which includes residential, light commercial collected
by municipal forces, street sweepings, catch basin cleanings, Parks Dept wastes
5) 1991 landfill total revised to include Symes transfer station, contaminated soil and sewage sludge quantities
6) Estimated 1991 waste export - 400,000 tonnes, which is assumed to be IC&I
7) Estimated 1992 waste export - 1,000,000 tonnes, which is assumed to be IC&I

Table 5.4

Preliminary Waste Generation Forecast
Metro Toronto

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	Industrial & Commercial Waste (Tonnes) (4)	Total Generation (Tonnes) (5)
1993	2,320,480	1,113,830	1,477,116	1,610,056	2,723,887
1994	2,343,148	1,124,711	1,489,836	1,623,921	2,748,632
1995	2,366,037	1,135,698	1,502,666	1,637,906	2,773,604
1996	2,389,150	1,146,792	1,515,607	1,652,012	2,798,804
1997	2,404,140	1,153,987	1,528,659	1,666,238	2,820,226
1998	2,419,130	1,161,182	1,541,823	1,680,587	2,841,769
1999	2,434,120	1,168,378	1,555,101	1,695,060	2,863,438
2000	2,449,110	1,175,573	1,568,493	1,709,657	2,885,230
2001	2,464,100	1,182,768	1,582,000	1,724,380	2,907,148
2002	2,470,430	1,185,806	1,592,104	1,735,393	2,921,200
2003	2,476,760	1,188,845	1,602,273	1,746,478	2,935,322
2004	2,483,090	1,191,883	1,612,507	1,757,633	2,949,516
2005	2,489,420	1,194,922	1,622,807	1,768,860	2,963,781
2006	2,495,750	1,197,960	1,633,172	1,780,157	2,978,117
2007	2,502,080	1,200,998	1,643,603	1,791,527	2,992,526
2008	2,508,410	1,204,037	1,654,102	1,802,971	3,007,008
2009	2,514,740	1,207,075	1,664,667	1,814,487	3,021,562
2010	2,521,070	1,210,114	1,675,299	1,826,076	3,036,190
2011	2,527,400	1,213,152	1,686,000	1,837,740	3,050,892
2012	2,532,890	1,215,787	1,696,769	1,849,478	3,065,265
2013	2,538,380	1,218,422	1,707,606	1,861,291	3,079,713
2014	2,543,870	1,221,058	1,718,513	1,873,179	3,094,237
2015	2,549,360	1,223,693	1,729,490	1,885,144	3,108,837

Notes:

(1) Population data prepared by Clayton Research Ass. Ltd., Hardy Stevenson & Ass., Feb./93

(2) Population projection multiplied by 0.48 tonnes/capita/year (based on historical data)

(3) Employment data based on Migration Trends in the Greater Toronto Area, Prepared for: The Office of the Greater Toronto Area by Clayton Research Ass. Ltd., December 1991; supplied by Hardy Stevenson & Associates

(4) Number of employees (col. 3) multiplied by 1.09 tonnes/employee/year (based on 1987 data)

(5) Column 2 plus Column 4

The residential waste generated in Metro Toronto in 1992 was estimated to have the following approximate composition (see Service Technical Appendix for details):

- 17% newspaper;
- 19% other paper;
- 5% glass;
- 4% tinplate steel;
- 1% aluminum;
- 6% plastic;
- 23% food;
- 11% yard waste;
- 3% disposable diapers; and
- 11% other materials.

These values were developed using residential waste composition data from studies carried out in East York in 1989 (Residential Waste Composition Study - Volume I of the Ontario Waste Composition Study, Gore and Storrie Ltd., January 1991). Based on the available data, the disposed residential waste stream is estimated to consist of the following categories:

- 15% newspapers;
- 23% other papers;
- 4% glass;
- 4% metal;
- 7% plastic;
- 32% food and yard waste; and
- 15% other materials.

These waste composition data are presented in Figure 5.2.

5.1.3 York Region Residential

Historical data on waste generation and management in the York Region is presented in Table 5.5. Residential waste generation in York Region is estimated to average 370 kg/capita/year.

Composition of Disposed Residential Waste
Metropolitan Toronto

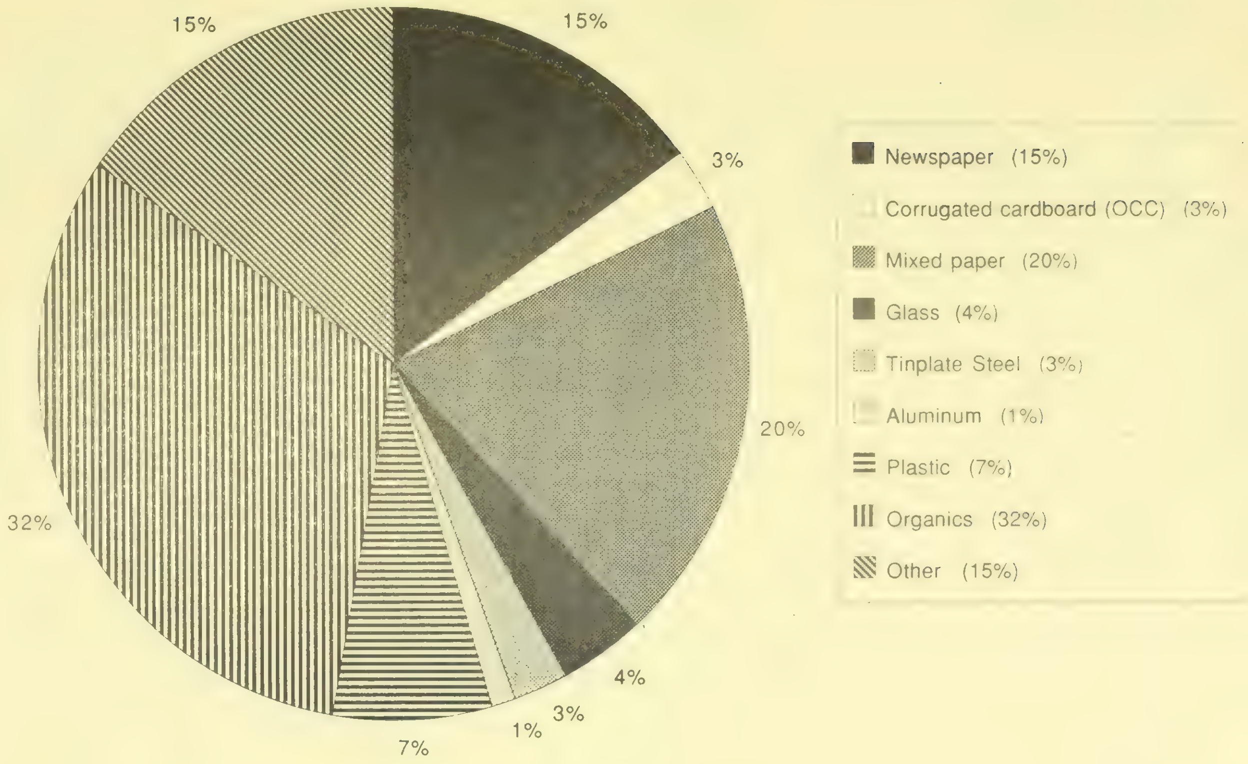


Table 5.5

Waste Generation & Management in York
1986-1992

Year	Region of York Population	Residential Generation (Tonnes)	Residential Generation Rate (T/Cap/Yr)	Residential Diversion Rate %	RESIDENTIAL DIVERSION (Tonnes) Total Residential Diversion	Green Waste	Backyard Compost	Blue Box	Igloo & Container	Other	Total ICI	WASTE LANDFILLED Residential (Tonnes)	IC&I (Tonnes)	Total (Tonnes)
1986	350,602	103,350	0.29									103,350	221,650	325,000
1987	386,103	158,295	0.41									158,295	339,487	497,782
1988	409,292	157,013	0.38	3.18	5,000			5,000				152,013	336,712	488,725
1989	442,022	140,711	0.32	5.22	7,352	752		6,600				133,359	377,296	510,655
1990	466,791	179,558	0.38	17.91	32,158	8,100		24,058				147,400	303,689	451,089
1991	504,981	174,532	0.35	21.11	36,839	9,400		27,439				137,693	161,643	299,336
1992	522,248	198,313	0.38	28.32	56,163	16,300	6,972	25,433		7,458		142,150	26,434	168,583
		Average =	0.37 (excl. 1986)											

Notes:

1) Population and employment data from Hardy Stevenson & Associates
2) 25000 tonnes added to total waste landfilled for the Twnship of King and Georgina Landfills for 1986-1991; 15000 tonnes added for 1992 personal communication with Mr. J Flewelling - Region of York
3) 1990 - 1991 Blue Box quantities supplied by OMMRI
4) 1992 Blue Box quantities: supplied by Markham, Richmond Hill, and J. Flewelling, Region of York
5) 1988 and 1989 Blue Box quantities for Markham only
6) 1988 Residential landfill quantity from Table 2-1, Waste Management Study, 1989, MacLaren
7) 1988 Residential landfill percentage applied to 1986 and 1987 to calculate quantity going to landfill (31.8%)

Projections for residential waste generation in York Region, from 1993 to the year 2015 are presented in Table 5.6. These were developed on the basis of a per capita generation rate of 370 kg/year. Any source reduction anticipated in this rate is addressed later in this report.

The residential waste generated in York Region is estimated to have the following composition:

- 17% newspaper;
- 18% other papers;
- 5% glass;
- 4% tinplate steel;
- 1% aluminum;
- 5.7% plastic;
- 22% food;
- 15% yard waste;
- 3% disposal diapers;
- 10% other materials.

These values were developed using residential waste composition data from studies carried out in East York in 1989 (Residential Waste Composition Study - Volume I of the Ontario Waste Composition Study, Gore and Storrie Ltd., January 1991). As 6,025 tonnes (10.7%) of the total residential waste stream recycled in 1992 is described as "other" material, diversion rates by material were the best possible estimates. Based on the available data, the disposed residential waste stream consisted of the following categories in 1992:

- 12% newspapers;
- 25% other papers;
- 3% glass;
- 4% metal;
- 7% plastic;
- 36% food and yard waste; and
- 13% other materials.

These waste composition data are presented in Figure 5.3.

Table 5.6

Preliminary Waste Generation Forecast
York Region

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	IC&I Waste (Tonnes) (4)	Total Generation (Tonnes) (5)
1993	540,106	199,839	271,678	429,251	629,090
1994	558,575	206,673	282,085	445,694	652,367
1995	577,675	213,740	292,892	462,769	676,509
1996	597,459	221,060	304,112	480,497	701,557
1997	615,017	227,556	315,762	498,904	726,460
1998	632,605	234,064	327,859	518,017	752,081
1999	650,193	240,571	340,419	537,862	778,433
2000	667,781	247,079	353,460	558,467	805,546
2001	685,370	253,587	367,000	579,860	833,447
2002	701,325	259,490	375,906	593,931	853,422
2003	717,280	265,394	385,027	608,343	873,736
2004	733,235	271,297	394,370	623,105	894,402
2005	749,190	277,200	403,940	638,225	915,426
2006	765,143	283,103	413,742	653,712	936,815
2007	780,277	288,702	421,560	666,065	954,767
2008	795,411	294,302	429,525	678,650	972,952
2009	810,545	299,902	437,641	691,473	991,374
2010	825,679	305,501	445,910	704,538	1,010,039
2011	840,019	310,807	454,335	717,849	1,028,656
2012	853,042	315,626	459,360	725,789	1,041,414
2013	865,270	320,150	464,440	733,815	1,053,965
2014	877,498	324,674	469,576	741,930	1,066,604
2015	889,726	329,199	474,769	750,135	1,079,334

Notes:

(1) Population data prepared by Clayton Research Ass Ltd., Hardy Stevenson & Ass., Feb /93

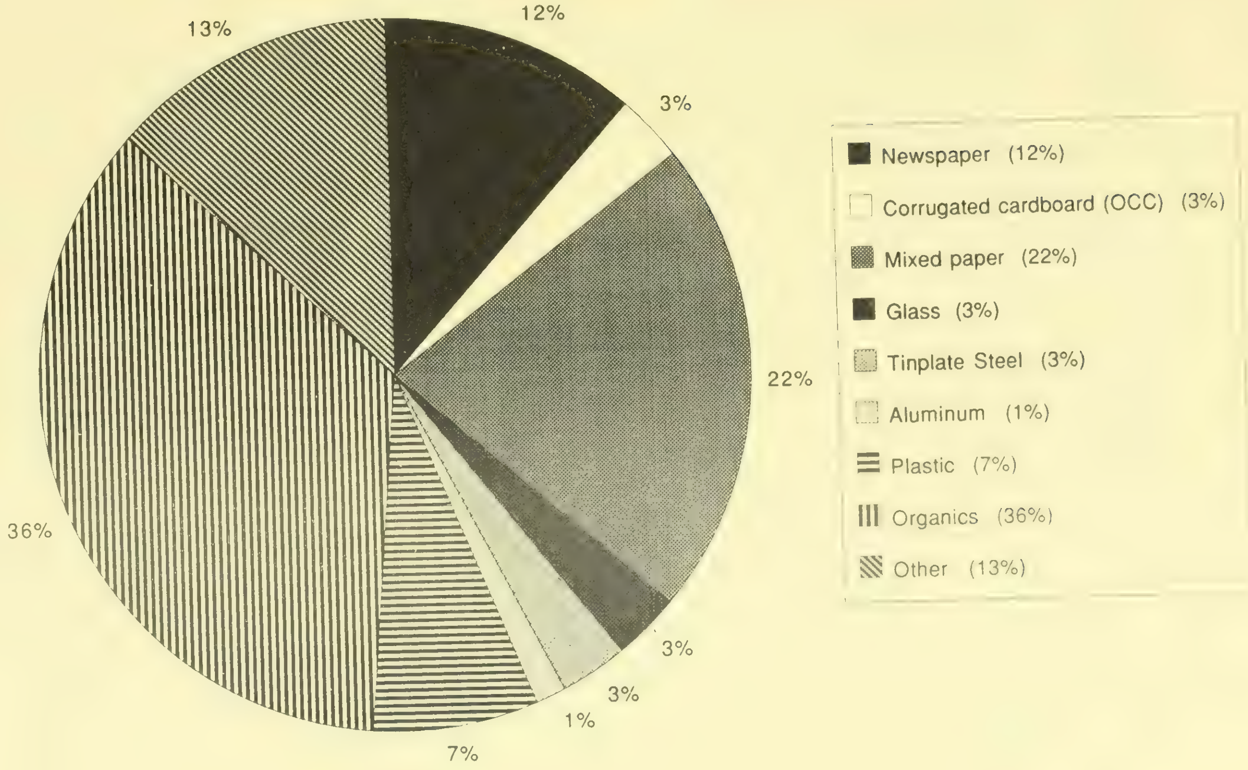
(2) Population projection multiplied by 0.37 tonnes/capita/yr (average rate based on historical data)

(3) Employment data based on Migration Trends in the Greater Toronto Area, Prepared for: The Office of the Greater Toronto Area by Clayton Research Ass. Ltd., December 1991; supplied by Hardy Stevenson & Associates

(4) Number of employees (col. 3) multiplied by 1.58 tonnes/employee/year ('86 & '87 average rate)

(5) Column 2 plus Column 4

Composition of Disposed Residential Waste
Region of York



5.1.4 Peel Residential

Historical data on waste generation and management in Peel Region is presented in Table 5.7. Residential waste generation in Peel Region is estimated to average 410 kg/capita/year.

Projections for residential waste generation in Peel Region, from 1993 to the year 2015 are presented in Table 5.8. These were developed on the basis of a per capita generation rate of 410 kg/year. Any source reduction anticipated in this rate is addressed separately.

The residential waste generated in Region of Peel was estimated to have the following composition:

- 17% newspaper;
- 19% other paper;
- 5% glass;
- 3.8% tinplate steel;
- 1% aluminum;
- 6% plastic;
- 23% food;
- 13% yard waste;
- 3% disposable diapers;
- 10% other materials.

These values were developed using residential waste composition data from studies carried out in East York in 1989 (Residential Waste Composition Study - Volume I of the Ontario Waste Composition Study, Gore and Storrie Ltd., January 1991). Based on the available data, the disposed residential waste stream in 1992 consisted of the following categories:

- 13% newspapers;
- 23% other papers;
- 4% glass;
- 4% metal;
- 7% plastic;
- 36% food and yard waste; and
- 13% other materials.

These waste composition data are presented in Figure 5.4.

Table 5.7

Waste Generation & Management in Peel
1986-1992

Year	Population	Residential Generation (Tonnes)	Residential Generation Rate (T/Cap/Yr)	Residential Diversion Rate %	RESIDENTIAL DIVERSION (Tonnes)						WASTE LANDFILLED		
					Total Residential Diversion	Green Waste	Backyard Compost	Blue Box	Igloo & Container	Other	Residential (Tonnes)	IC&I (Tonnes)	Total (Tonnes)
1986	592,170	*242,790*	*0.40*										716,385
1987	636,475	252,391	0.40								252,391	449,360	701,751
1988	667,445	264,103	0.40								264,103	478,926	743,030
1989	702,450	307,922	0.44	9.86	30,351		1,800		200		277,571	470,449	748,021
1990	724,530	312,887	0.43	12.84	40,166	3,639	5,297	30,497	250	483	272,721	361,513	634,234
1991	744,700	292,421	0.39	15.93	46,593	4,611	9,573	30,469	540	1,400	245,828	224,086	469,914
1992	763,000	317,331	0.42	20.17	64,002	7,661	13,641	34,867	5,793	2,040	253,329	44,203	297,532
		Average =	*0.41*										

Notes:

1) Population data supplied by Hardy Stevenson & Ass., Feb/93
2) Estimated waste export for 1991 - 53,125 tonnes exported; Estimated 1992 waste export - 253,183 tonnes (assumed to be IC&I)
3) 1991 and 1992 Green Waste totals include compost from Mississauga wet/dry project.
4) 1989 Total Residential Diversion (tonnes) from "Identification of Waste Diversion Initiatives in the GTA", SENES Consultants, April, 1991

Table 5.8

Preliminary Waste Generation Forecast
Peel Region

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	Industrial & Commercial Waste (Tonnes) (4)	Total Generation (Tonnes) (5)
1993	784,500	321,645	415,679	581,951	903,596
1994	808,800	331,608	426,962	597,747	929,355
1995	833,500	341,735	438,552	613,973	955,708
1996	859,300	352,313	450,455	630,637	982,950
1997	879,500	360,595	462,682	647,755	1,008,350
1998	900,700	369,287	475,241	665,337	1,034,624
1999	921,900	377,979	488,141	683,397	1,061,376
2000	953,100	390,771	510,391	714,547	1,105,318
2001	974,300	399,463	515,000	721,000	1,120,463
2002	991,100	406,351	522,314	731,240	1,137,591
2003	1,007,900	413,239	529,733	741,626	1,154,865
2004	1,024,700	420,127	537,256	752,158	1,172,285
2005	1,041,500	427,015	544,887	762,842	1,189,857
2006	1,058,100	433,821	552,626	773,676	1,207,497
2007	1,072,100	439,561	560,474	784,664	1,224,225
2008	1,086,100	445,301	568,435	795,809	1,241,110
2009	1,100,100	451,041	576,508	807,111	1,258,152
2010	1,114,100	456,781	584,696	818,574	1,275,355
2011	1,127,900	462,439	593,000	830,200	1,292,639
2012	1,139,500	467,195	601,422	841,991	1,309,186
2013	1,150,500	471,705	609,964	853,950	1,325,655
2014	1,162,000	476,420	618,627	866,078	1,342,498
2015	1,173,500	481,135	627,414	878,380	1,359,515

Notes:

(1) Population data supplied by Clayton Research Ass. Ltd., Hardy Stevenson and Associates, Feb/93

(2) Population projection multiplied by 0.41 tonnes/capita/year (based on historical data)

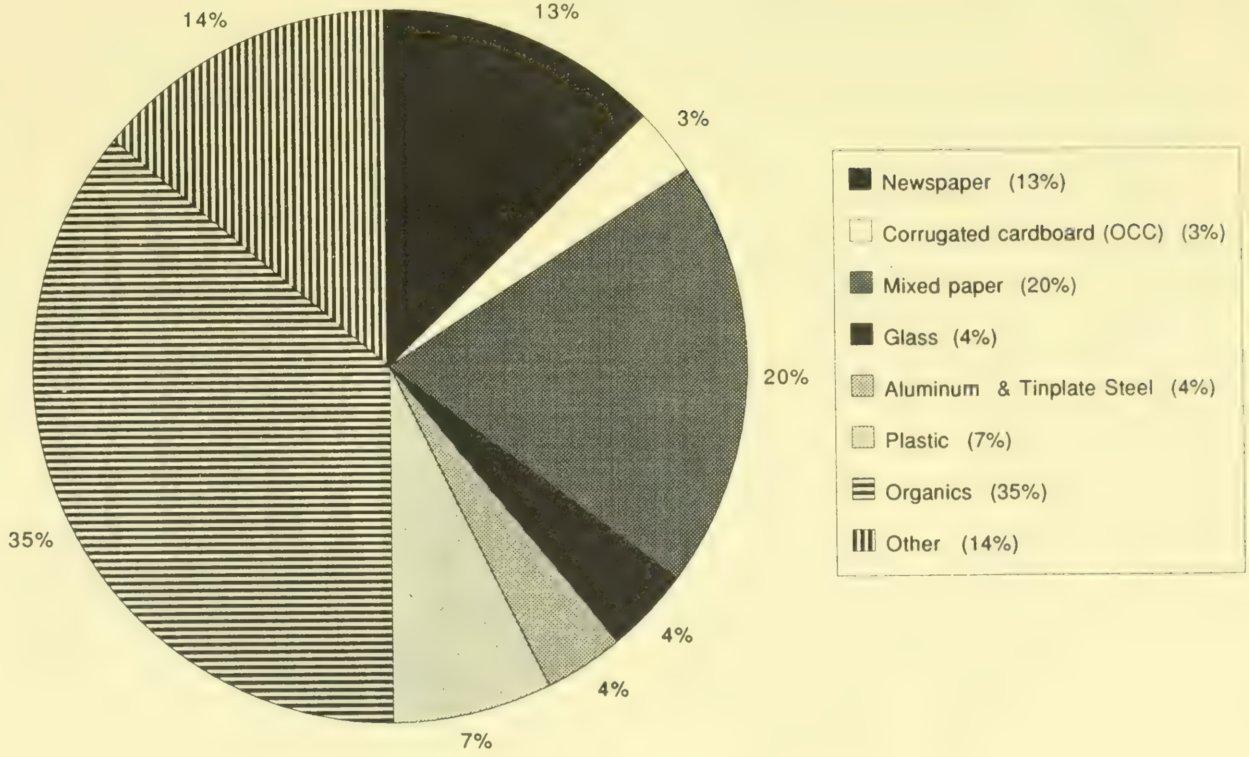
(3) Employment data based on Migration Trends in the Greater Toronto Area, Prepared for:
The Office of the Greater Toronto Area by Clayton Research Ass. Ltd., December 1991;
supplied by Hardy Stevenson & Associates

(4) Number of employees (col. 3) multiplied by 1.4 tonnes/employee/year (based on 1987 data)

(5) Column 2 plus Column 4

Figure 5.4

Composition of Disposed Residential Waste
Region of Peel



5.1.5 Halton Region Residential

Historical data on waste generation and management in the Halton Region is presented in Table 5.9. Residential waste generation in Halton Region is estimated to average 440 kg/cap/year.

Projections for residential waste generation in Region of Halton, from 1993 to the year 2015 are presented in Table 5.10. These were developed on the basis of a per capita generation rate of 410 kg/year. Any source reduction anticipated in this rate is addressed later in this report.

The residential waste generated in Halton Region was estimated to have the following composition:

- 16% newspaper;
- 18% other paper;
- 5% glass;
- 4% tinplate steel;
- 1% aluminum;
- 6% plastic;
- 22% food;
- 16% yard waste;
- 3% disposable diapers; and
- 10.1% other materials.

These values were developed using residential waste composition data from studies carried out in East York in 1989 (Residential Waste Composition Study - Volume I of the Ontario Waste Composition Study, Gore and Storrie Ltd., January 1991). Based on the available data, the disposed residential waste stream consisted of the following categories:

- 8% newspapers;
- 26% other papers;
- 2% glass;
- 14% metal and plastic;
- 33% food and yard waste; and
- 17% other materials.

These waste composition data are presented in Figure 5.5.

Table 5.9

Waste Generation & Management in Halton
1986-1992

Year	Population	Residential Generation (Tonnes)	Residential Generation Rate (T/Cap/Yr)	Residential Diversion Rate %	RESIDENTIAL DIVERSION (Tonnes)						WASTE LANDFILLED		
					Total Residential Diversion	Green Waste	Backyard Compost	Blue Box	Igloo & Container	Other	Residential (Tonnes)	IC&I (Tonnes)	Total (Tonnes)
1986	271,389												
1987	275,945												
1988	284,994												
1989	291,600					1,812							
1990	297,650	115,151	0.39	20.97	24,151	3,747		20,404			91,000	101,000	192,000
1991	313,136	123,014	0.39	30.33	37,314	8,140		25,934	3,240		85,700	70,000	155,700
1992	318,893	137,018	0.43	35.19	48,218	15,000	6,168	23,450	3,600		88,800	13,800	102,600
		Average =	*0.40*										

Notes:

1) Population data supplied by Hardy Stevenson and Associates, Feb./93
2) There is no landfill information available prior to 1990 (personal communication with Region of Halton staff)

Table 5.10

Waste Generation Forecast
Halton Region

Year	Population (1)	Residential Waste (Tonnes) (2)	Number of Employees (3)	Industrial & Commercial Waste (Tonnes) (4)	Total Generation (Tonnes) (5)
1993	324,756	129,902	158,565	112,581	242,484
1994	330,727	132,291	163,029	115,751	248,041
1995	336,807	134,723	167,618	119,009	253,732
1996	343,000	137,200	172,337	122,359	259,559
1997	351,538	140,615	177,189	125,804	266,419
1998	360,290	144,116	182,177	129,346	273,462
1999	369,259	147,704	187,306	132,987	280,691
2000	378,452	151,381	192,579	136,731	288,112
2001	387,873	155,149	198,000	140,580	295,729
2002	397,529	159,012	202,180	143,548	302,559
2003	407,425	162,970	206,448	146,578	309,548
2004	417,568	167,027	210,806	149,672	316,699
2005	427,963	171,185	215,256	152,832	324,017
2006	438,617	175,447	219,800	156,058	331,505
2007	449,536	179,814	224,440	159,352	339,167
2008	460,727	184,291	229,178	162,716	347,007
2009	472,197	188,879	234,016	166,151	355,030
2010	483,952	193,581	238,956	169,659	363,240
2011	496,000	198,400	244,000	173,240	371,640
2012	508,347	203,339	249,151	176,897	380,236
2013	521,002	208,401	254,411	180,632	389,033
2014	533,972	213,589	259,781	184,445	398,033
2015	547,265	218,906	265,265	188,338	407,244

Notes:

(1) Population data from Clayton Research Associates Ltd., Hardy Stevenson and Associates (Feb

(2) Population projection multiplied by 0.40 tonnes/capita/year (based on historical data)

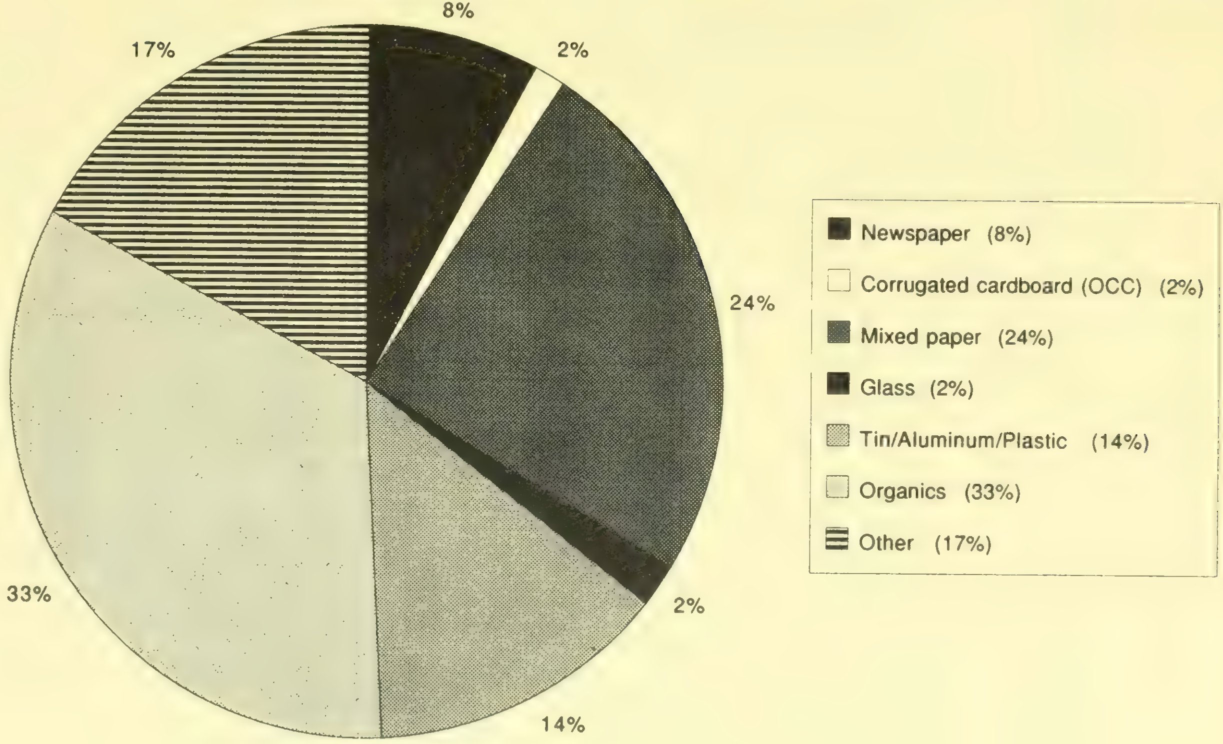
(3) Employment data supplied by Hardy Stevenson & Ass., based on Migration Trends in the GT
Prepared for: The Office of the Greater Toronto Area by Clayton Research Ass. Ltd., Dec,/91

(4) Number of employees (col. 3) multiplied by 0.71 tonnes/employee/year (based on 1990 data)

(5) Column 2 plus Column 4

Figure 5.5

Composition of Disposed Residential Waste
Region of Halton



5.1.6 IC&I Waste Quantities and Composition

IC&I waste quantities and composition were first estimated for each GTA Region (including Halton) and were added together to estimate IC&I quantities for the GTA. IC&I systems were developed for the GTA rather than for separate Regions, as IC&I waste management crosses municipal and Regional boundaries.

Tables 5.1, 5.3, 5.5, 5.7 and 5.9 show available data on IC&I waste disposed at Regional landfills between 1986 and 1992. These data are summarized in Table 5.11. Data on IC&I waste disposed for the years 1986 to 1988 are considered to be reasonably close to the IC&I waste generated, reflecting minimal waste diversion occurring in the IC&I sector at that time. Waste diversion activities became more active from 1989 on, IC&I waste export began in mid-1991 and the recession likely had an impact on waste generation in 1991 and 1992. Therefore, reported IC&I waste disposed in GTA from 1989 on may not reflect the total quantity of IC&I waste generated.

IC&I waste exported from GTA is considered disposed and not diverted through 3Rs. Because of the difficulty obtaining complete data on the quantities of waste exported for disposal in 1991 and 1992, a theoretical approach was used to estimate IC&I waste generation and diversion. IC&I waste generation is estimated by multiplying employment data for the GTA in each year by an assumed IC&I generation rate of approximately 1.17 tonnes/employee/year which is based on historical IC&I disposal data for GTA. On this basis, it is estimated that the total IC&I waste generation in GTA was 2.9 million tonnes in 1992. Total GTA employment in 1992 is estimated at 2,461,685 (see Table 4.18). Diversion in 1992 is estimated to have been approximately 720,000 to 900,000 tonnes. IC&I waste disposed is estimated to have been 2 million tonnes (an estimate of the amount of waste exported is not considered in this analysis.) The Service Technical Appendix provides the rationale for these estimates.

Projections of IC&I waste generation in GTA for the years 1993 to 2015 are presented in Table 5.12. They have been based on average IC&I generation rates (1.17 tonnes/employee/year) applied to future employment projections for each Region. These employment projections will be revised in a Greater Toronto Co-ordinating Committee (GTCC) study currently being carried out by Coopers and Lybrand, and expected in late 1993.

The composition of IC&I waste was estimated using a two step waste allocation process described in detail in the Service Technical Appendix. An in-house waste allocation and composition model (which was developed using the result of a number of IC&I waste generation and composition studies) was used to first allocate estimated IC&I waste

Summary of Available Data on IC&I Waste Disposal in GTA Regions 1986-1992

Year	Durham IC&I Disposal (tonnes)	Halton IC&I Disposal (tonnes)	Peel IC&I Disposal (tonnes)	Metro IC&I Disposal (tonnes)	York IC&I Disposal (tonnes)	Total GTA IC&I Disposal (tonnes)
1986	*152,125*			1,445,857	221,650	1,819,632
1987	161,826		449,360	1,490,098	339,487	2,440,772
1988	190,509		478,926	1,405,066	336,712	2,411,213
1989	189,353		470,449	1,241,573	377,296	2,278,671
1990	190,264	101,000	361,513	1,169,697	303,689	2,126,163
1991	118,694	70,000	224,086	704,492	161,643	1,278,915
1992	62,615	13,800	44,203	200,015	26,434	347,066

Notes:

1) For all Regions, IC&I waste quantities to landfill were calculated by difference between total waste to landfill and residential waste to landfill

2) 1986 Durham value equals total waste landfilled (from SWEAP 4.1 report,1988) less residential waste to landfill(estimated from 1987 generation rate)

3) 1987 Durham value equals total waste landfilled (from MacLaren Waste Study,1988) less residential waste to landfill

4) Total waste to landfill for Durham taken from Metro landfill records for 1988-1992; tonnages for Brock & Scott landfills added to total waste landfilled.

5) Residential waste to landfill taken from Region of Durham landfill records.

6) Metro landfill data taken from Metro Toronto landfill records

7) 1991 Metro IC&I quantity excludes waste export. Metro assumes that 400,000 tonnes were exported, which is assumed to be primarily IC&I

8) 1992 Metro IC&I quantity excludes waste export. Metro assumes that 1,000,000 tonnes were exported, which is assumed to be primarily IC&I

9) 1991 Peel IC&Iquantity excludes waste export. Peel assumes that 53,125 tonnes were exported, which is assumed to be primarily IC&I

10) 1992 Peel IC&I quantity excludes waste export. Peel assumes that 253,183 tonnes were exported, which is assumed to be primarily IC&I

11) 1988 residential landfill quantity for Region of York from Table 2-1, Waste Management Study, 1989, MacLaren

12) 1988 residential landfill percentage for Region of York applied to 1986 and 1987 to calculate quantity going to landfill (31.8%)

13) 25000 tonnes added to total waste landfilled for the Twnship of King and Georgina Landfills for 1986-1991; 15000 tonnes added for 1992. personal communication with Mr. J. Flewelling - Region of York

14) Halton landfill data supplied by Region of Halton; there were no landfill data available prior to 1990

Table 5.12
Preliminary IC&I Waste Generation Estimate
for GTA
1993 to 2015

Year	Durham Region IC&I Waste Generation (tonnes)	Halton Region IC&I Waste Generation (tonnes)	Metro Toronto IC&I Waste Generation (tonnes)	Peel Region IC&I Waste Generation (tonnes)	York Region IC&I Waste Generation (tonnes)	Total GTA IC&I Waste Generation (tonnes)
1993	205,568	112,581	1,610,056	581,951	429,251	2,939,408
1994	211,748	115,751	1,623,921	597,747	445,694	2,994,861
1995	218,114	119,009	1,637,906	613,973	462,769	3,051,771
1996	224,671	122,359	1,652,012	630,637	480,497	3,110,176
1997	231,426	125,804	1,666,238	647,755	498,904	3,170,128
1998	238,384	129,346	1,680,587	665,337	518,017	3,231,671
1999	245,550	132,987	1,695,060	683,397	537,862	3,294,857
2000	252,932	136,731	1,709,657	714,547	558,467	3,372,335
2001	260,537	140,580	1,724,380	721,000	579,860	3,426,357
2002	265,682	143,548	1,735,393	731,240	593,931	3,469,794
2003	270,930	146,578	1,746,478	741,626	608,343	3,513,954
2004	276,280	149,672	1,757,633	752,158	623,105	3,558,848
2005	281,737	152,832	1,768,860	762,842	638,225	3,604,496
2006	287,301	156,058	1,780,157	773,676	653,712	3,650,906
2007	292,975	159,352	1,791,527	784,664	666,065	3,694,583
2008	298,762	162,716	1,802,971	795,809	678,650	3,738,908
2009	304,663	166,151	1,814,487	807,111	691,473	3,783,885
2010	310,680	169,659	1,826,076	818,574	704,538	3,829,527
2011	316,816	173,240	1,837,740	830,200	717,849	3,875,845
2012	319,950	176,897	1,849,478	841,991	725,789	3,914,105
2013	323,117	180,632	1,861,291	853,950	733,815	3,952,804
2014	326,313	184,445	1,873,179	866,078	741,930	3,991,945
2015	329,543	188,338	1,885,144	878,380	750,135	4,031,540

Notes:

1 Refer to Tables 5.2, 5.4, 5.6, 5.8 and 5.10 for notes on information sources and calculations

generation to a number of IC&I sectors. The composition of waste generated by each IC&I sector was combined with the relative quantities of waste generated by each IC&I sector to calculate the estimated composition of the IC&I waste stream generated in the GTA. The quantity of construction and demolition (C&D) waste generated in GTA was estimated using historical data. The composition of C&D waste generated in GTA was estimated using results of waste composition studies carried out by Proctor and Redfern (SWEAP Paper 4).

The composition of the IC&I waste stream generated in 1992 is estimated to have the following composition: paper (mixed plus newspaper, 22.1%), OCC (12.4%), metals (10.7%, 6.7% ferrous, 4% non-ferrous), plastics (8.6%), glass (2.6%), wood (7.9%), food and yard (7.7%), total C&D (construction and demolition) (21%) and all "other" (6.9%). The methodology used to develop this estimate is described in the Service Technical Appendix. Figure 5.6 presents the estimated composition of generated IC&I waste.

5.2 Existing Residential 3Rs System

The residential 3Rs systems in place in each of the GTA Regional municipalities in 1992 is described in the following sections. This is referred to as the Existing System for this study.

5.2.1 Durham Region

5.2.1.1 Existing Residential 3Rs System Description

In 1992, an estimated 141,672 tonnes of residential waste were generated in Durham. The basis of this estimate is presented in Section 5.5.1. Of this, 38,581 tonnes were diverted and 103,091 tonnes disposed for an estimated residential waste diversion rate of 27.2%. Estimated residential waste diversion was made up of the following activities:

Blue Box curbside	17,166 tonnes
Dry recyclables from depots	2,691 tonnes
Other dry recyclables diverted	5,291 tonnes
Leaf and yard waste	8,045 tonnes
Household wet waste through backyard composters	5,388 tonnes
Total diverted 1992	38,581 tonnes

This information is summarized in Table 5.13.

Figure 5.6

Composition of Disposed ICI Waste
GTA

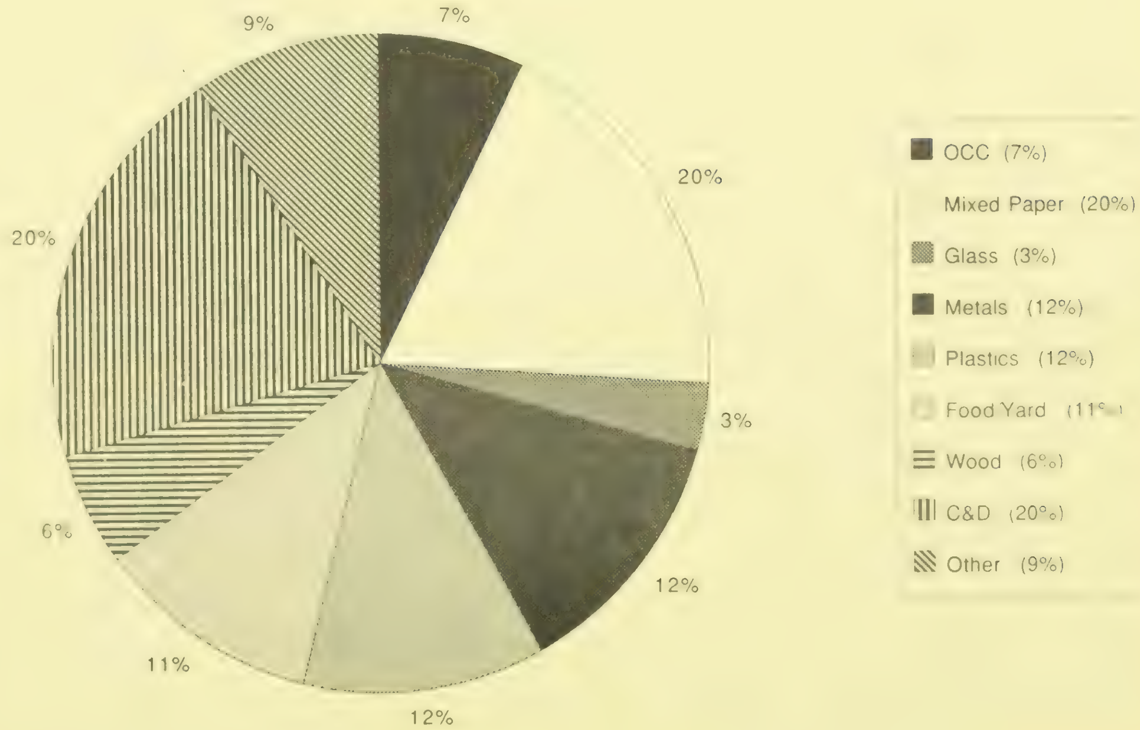


TABLE 5.13
SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE
REGION OF DURHAM
1992

Regional Characteristics	
Regional Population	422,825
Total Number of Households	147,105
Single Family	101,576
- multi-family	11,616
- other	33,913
Households served by curbside	101,576
Households served by depot	22,000
Number of backyard composters distributed	22,450
Residential Material Diverted in 1992	
Blue Box	17,166 tonnes
Depots (Blue Box materials)	2,691 tonnes
Depots (other materials)	5,291 tonnes
Leaf and yard waste collection and composting	8,045 tonnes
Diversion through backyard composters	5,388 tonnes
Total residential waste diverted	38,581 tonnes
Residential Waste Diversion Summary	
Waste generated	141,672
Waste diverted	38,581
Waste disposed	103,091
Waste diversion rate	27.2%

Source: Data obtained from Region of Durham staff.
Population and Household Data Provided by HSA.
Backyard Composter diversion estimated by RIS staff.

In 1992, residential recycling services in Durham Region consisted of the following activities:

- 101,576 single family households were provided with bi-weekly curbside collection of Blue Box recyclables;
- rural residences were served by depots and containers situated throughout the Region;
- Igloos and domes provided opportunities to recycle in public areas;.

- 22,450 backyard composters had been distributed to single-family dwellings;
- extensive promotion and education programs;
- curbside pick-up of leaf and yard waste in several municipalities;
- one Regional leaf and yard waste composting site;
- re-use activities by Goodwill Industries (clothes, durable goods, etc.);
- one attended donation centre at Ritson Transfer Station;
- three permanent HHW depots, including Brock West landfill (operated by Metro), Scugog transfer station, Oshawa transfer station;
- the Toxic Taxi service was discontinued in the fall of 1992;
- drop-off depot for white goods collection at Lasco Steel transfer station; and
- one MRF (the Durham Recycling Centre) owned and operated by Durham Region.

These activities are described under a number of headings below.

Residential Recycling and Collection

In 1992, Durham Region contained an estimated 147,105 households. Of these, 101,576 were single-family households, 11,616 were high rise apartments and 33,913 were other households, including semi-row townhouses, low-rise apartments, mobile homes etc.

In 1992 an estimated 123,976 single, multi-family and rural households in Durham Region were served with some form of recyclables collection. Of these:

- 101,576 single-family households were served with curbside collection of Blue Box materials (reported by the Regional Municipalities);

- 2,400 apartments were served with collection of recyclables (reported by OMMRI); and

- 20,000 rural residences were served by depots and containers situated throughout the Region (reported by OMMRI).

Data were obtained from the local municipalities on the quantities of each material collected by curbside programs. These were somewhat different to the totals in the Region's 1993 Annual Report (Region of Durham Commissioners Report to Works Committee, February 9, 1993). The latter source was used as the most comprehensive source of information. The information from the municipalities was valuable in assigning materials to different categories for waste composition estimates.

The following tonnages of materials were collected from residential (and some IC&I) sources in 1992, and were processed at the Region of Durham MRF (20,996 tonnes total, including 1,140 tonnes of OCC, mixed paper and other recyclables from the IC&I sector):

- 12,377 tonnes of Old News Papers (ONP) and Old Magazines and Catalogues (OMG) (commingled);
- 1,411 tonnes of OCC;
- 115 tonnes of Telephone Directories;
- 2,443 tonnes of Aluminum and Steel (commingled);
- 4,211 tonnes of Glass;
- 155 tonnes of polyethylene terephthalate (PET);
- 284 tonnes of fine paper (not colour separated, collected only from Region and Municipal offices and a few IC&I locations, program likely to be discontinued in 1993).

In February 1992, 7 out of 8 municipalities in the Region switched from weekly to bi-weekly collection of recyclables. On a Regional basis, a slight reduction in gross recyclables collected was experienced (3.6%), however, some increases were noted in individual municipalities. For example, the City of Oshawa reported a 7.8% increase and the Town of Newcastle reported an 8.5% increase in the weight of materials collected curbside over 1991 (weekly) recovery levels. The switch to bi-weekly collection of recyclables resulted in an overall cost saving to the curbside collection program of 28%.

Residential Household Composting

At the end of 1992, 22,450 backyard composting units had been distributed by the Region of Durham. It is estimated that 5,388 tonnes of organic material were diverted through this program in 1992, assuming a diversion rate of 240 kg/composter/year (see explanation below).

In addition to sales through 12 distribution centres, a company called "Students for the Environment" carried out door-to-door promotion and education of home composting activities, as well as sales of composting units in the more urbanized area of the Region late in the summer of 1992. Some of this activity was funded by MOEE as a promotion/ education activity.

Durham Region was host to a backyard composting demonstration program in the summer of 1989. A second backyard composting study which started in the Fall of 1990 showed that backyard composting units can divert an estimated 240 kg/household/year. Amortized over a period of 10 years, this study estimated the cost of residential waste diversion through backyard composting at approximately $18.75/tonne material diverted (Region of Durham Backyard Composting Study Draft Report, Compost Management Associates, 1992). A full year study initiated in 1992 in the Region has shown a diversion rate of between 153 and 258 kg/hh/yr through backyard composting. Using the higher of the two figures, an average cost per tonne of material diverted (amortized over a 10 year period) is $23.16. The program was funded 100% by MOEE. Total cost of the home composting units was $59.35 per unit, including delivery, project monitoring and administrative costs. (A Field Examination of the Cost Effectiveness, Waste Diversion Potential, and Homeowner Acceptance of Backyard Composting Units Phase II: The Pickering Research, 12 Month Interim Report Compost Management Associates, June 1992.)

Staffing to administer the backyard composting program consists of approximately 50% of a co-ordinators time, as well as occasional support from any Environmental Youth Corps (EYC) students that may be available.

Residential Leaf and Yard Waste Collection/Composting Facilities

In 1992, curbside collection of green waste in Durham Region totalled 7,331 tonnes. An additional 714 tonnes of leaf and yard waste were collected from transfer, depot and private sources in 1992, for a total of 8,045 tonnes. Leaf and yard waste is processed in a composting facility that was initially constructed by the Durham Regional Works Department. The site is 25 acres in size, and is located next to the Regional MRF.

5.2.1.3 Durham Region - Costs

The total cost for the residential waste diversion program in 1992 was $6,190,420. Blue Box collection costs for Durham Region were approximately $1,767,000, with an additional $3,954,300 for processing. Durham has a Region-wide recycling collection contract that pays the contractor 68.7 cents per household served, per pick-up. The best information available at this time suggests that the balance of the waste diversion budget ($469,120) is related to the collection and maintenance of recycling depots and igloos, leaf and yard waste collection and processing, debt charges, administration etc. In 1992, revenues totalled $543,100 for material sales. MOEE funding totalled $596,000. (Reference: Municipal Finance Technical Appendix).

Financial responsibility for funding 3Rs programs remains with Durham Region. While the area municipalities undertake all Blue Box collections, Durham Region reimburses each via its Waste Management Reserve. The Region assumes full financial responsibility for processing materials. Payments to the area municipalities for collection and processing in 1992 approached $1.7 million. A tipping fee of $110 per tonne was charged in 1992 to each municipality for recyclable materials delivered to the Durham Recycling Centre. The tipping fee does not necessarily cover the total costs of collecting and processing recyclable materials. Operating shortfalls are financed through the Waste Management Reserve and in 1992 this contribution totalled $5,147,800 (Reference: Future Urban Research, 1993).

Based on the results of various backyard composting studies carried out in Durham Region, the cost of waste diversion through the use of backyard composters ranged from $18.75/tonne to $23.16/tonne material diverted, amortized over a period of 10 years. The existing Durham Region backyard composting program was funded 100% by MOEE. Total cost of the home composting units was $59.35 per unit, including delivery, project monitoring and administrative costs. Costs related specifically to 1992 promotion/ education efforts for Durham's composting program were not available. Promotional efforts are conducted in conjunction with other projects.

Tipping fees for Brock West landfill in Region of Durham were $152.25/tonne in 1992. Tipping fees were lowered to $90/tonne in May, 1993. The Region had an arrangement whereby a certain allocation of waste from Durham was disposed at no charge in Brock West. This allocation has expired, and the Region paid the full tipping fee in 1992, with a rebate of $70/tonne for an actual cost of $80/tonne. (Reference: Municipal Finance Technical Appendix and personal communication with Durham Region staff).

The total system cost (diversion plus disposal) for the Existing system averages $140/household/year. This is made up of $35/household/year for the diversion system, and $105/household/year for disposal.

5.2.2 Metro Toronto

5.2.2.1 Existing Residential 3Rs System Description

In 1992, an estimated 1,077,245 tonnes of residential waste (which includes some commercial and municipally generated waste) were generated in Metropolitan Toronto. Of this, 208,632 tonnes were diverted and 868,613 tonnes disposed for an estimated residential waste diversion rate of 19.4%. Estimated residential waste diversion was made up of the following activities:

Blue Box curbside	99,671 tonnes
Dry Recyclables from depots	2,611 tonnes
Large appliances/scrap metal	9,413 tonnes
Leaf and yard waste	71,062 tonnes
Household wet waste through backyard composters	25,200 tonnes
HHW	675 tonnes
TOTAL DIVERTED 1992	208,632 tonnes

This information is summarized in Table 5.14.

In 1992, residential recycling services in Metro Toronto consisted of the following activities:

- residential curbside recycling services to 704,000 households;
- igloos and domes in public areas;
- 105,000 backyard composters;
- 25 large 3-bin composting units for apartments and cooperative housing complexes;
- Recycling service to approximately 65% of units in multi-family buildings;
- 6 leaf and yard waste composting facilities operated by Metro or municipalities;
- 3 MRFs processing container and fibre materials;

TABLE 5.14
SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE
METRO TORONTO
1992

Regional Characteristics	
Regional Population	2,298,931
Total Number of Households	872,162
- single family - multi-family - other	288,275 314,385 269,502
Households served by curbside	704,000
Number of backyard composters distributed	105,000
Residential Material Diverted in 1992	
Blue Box	99,671 tonnes
Depots (Blue Box materials)	2,611 tonnes
Other materials	10,088 tonnes
Leaf and yard waste collection and composting	71,062 tonnes
Diversion through backyard composters	25,200 tonnes
Total residential waste diverted	208,632 tonnes
Residential Waste Diversion Summary	
Waste generated	1,077,245 tonnes
Waste diverted	208,632 tonnes
Waste disposed	868,613 tonnes
Waste diversion rate	19.4%

Source: Household and population data obtained from HSA
Diversion data obtained from Regional and Municipal staff
Backyard composter diversion data estimated by RIS staff using diversion rate of 240 kg/composter/year (measured in Region of Durham Study)

- Goodwill Industries operates 10 "Attended Donation Centres," 20 stores for donating clothing and small items and a training facility for repairing mattresses, furniture, small engines;

- ReUze Centre in Scarborough;

- Second Harvest, a non profit organization that acts as a broker between sources of surplus perishable food and social service organizations that can use it;

- 10 permanent HHW depots - eight in Metro, one at the Keele Valley landfill and one at the Brock West Landfill, each operated for 2 days per week;

- two toxic taxis operated 6 days per week to residents with a minimum of 10 litres of HHW for disposal;

- curbside collection of white goods in East York, Etobicoke and York;

- drop-off depot for white goods in Etobicoke;

- pilot wet collection program;

- extensive advertising, education and promotion, including a general information hotline operated by Metro Toronto; and

- landfill bans on OCC, office paper, tires, drywall, scrap metal, surplus goods, off-specification goods, excavated material and wood.

These activities are described under a number of headings below:

Residential Recycling and Collection

In 1992, Metro Toronto contained an estimated 872,162 households of which 288,275 were single-family dwellings, 314,385 were high-rise apartments and 269,502 were other households, including semi-row townhouses, low-rise apartments, mobile homes, etc.

In 1992, 704,000 households in Metro Toronto were provided with curbside residential recycling collection. There were also a small number of IC&I commercial enterprises receiving collection, predominantly in the City of Toronto.

Area municipalities launched curbside Blue Box recycling programs between 1988 and 1989. All municipalities offer residents weekly curbside pick-up, except the City of Toronto which operates a unique program that collects paper and container materials on alternate weeks, providing a bi-weekly collection service for each material.

The following materials were collected from the Blue Box programs and depots operating in all of the municipalities in Metropolitan Toronto in 1992:

• ONP and OMG (commingled)	57,995 tonnes
• OCC	2,786 tonnes
• Telephone directories	1,098 tonnes
• Glass	23,789 tonnes
• Steel (including scrap metal and white goods)	18,314 tonnes
• Aluminum	387 tonnes
• PET	635 tonnes
• HDPE	1,141 tonnes
• Metal, Wood, Tires, Textiles, etc.	6,225 tonnes

Curbside collection of recyclable materials in Metro Toronto is operated by each municipality. The City of Toronto utilizes conventional garbage packers to collect recyclables. The container materials and fibres are set out by the householder on alternate weeks, and loaded directly into the back of a packer truck. These vehicles require two person crews to operate.

All other municipalities in Metro Toronto collect recyclable materials with compartmentalized recycling vehicles operated by one person. Recyclables collected from households in East York, York, and all apartment households served by curbside pick-up in Metropolitan Toronto are sorted into two compartments, one for fibres, the other for container materials. In contrast, recyclables collected in Scarborough, Etobicoke, and North York are sorted into the following four streams:

- ONP, OCC and OMG;
- clear glass;
- coloured glass; and
- tinplate steel, aluminum cans and plastics.

Residential Household Composting

At the end of 1992, approximately 105,000 backyard composters had been distributed to Metro Toronto households. Based on an estimated diversion rate of 240 kg/unit, approximately 25,200 tonnes of organic waste was diverted from landfill in 1992 through the use of backyard composters.

Composters are distributed to Metro Toronto residents at a charge of $10 per unit. They can be purchased at all Metro transfer stations, or, for an additional charge of $5, the unit can be delivered to the door. Composters are also available for sale at leaf and yard waste compost giveaway events, or at household hazardous waste collection drop-offs. (In 1993, an additional method of distribution is expected to be added to Metro's program. Students for the Environment, a private company, will be conducting door-to-door promotion and sales of composting units.)

Promotional efforts include radio and newspaper advertisements, backyard composting manuals which have been published in many languages, displays and a telephone hotline. Metro Toronto also offers extensive educational support, including a master composter program, which is operated on Metro's behalf by the Recycling Council of Ontario (RCO).

In 1992, the total cost to purchase and distribute composters, administer and advertise the program was about $39 per unit. This cost takes into account any available Ministry funding. It does not include Master Composter program costs or information officers' salaries.

To address the composting needs of residents of multi-residential dwellings in the Metro Area, community composting activities are being promoted. Large 3-bin units are available to apartment and co-operative housing complexes for $150 each. By the end of 1992, 25 of these units were in use. This program is to be expanded in 1993.

Metro Toronto recently conducted a study to determine the long-term usage of backyard composting units. It was discovered that 98% of units distributed since 1989 are still in use.

Residential Leaf and Yard Waste Collection/Composting Facilities

In 1992, collection of leaf and yard waste in Metro Toronto totalled 71,062 tonnes. Leaf and yard waste is processed at six centralized windrow composting facilities - the Keele Valley landfill site, three sites in North York, one in Etobicoke and one in Scarborough. Keele Valley is the largest and employed 17 people in 1992, although that number is expected to drop to nine or ten in 1993. The Keele Valley facility accepted waste from the cities of York and Toronto and the Borough of East York. Due to odour complaints and other problems, however, North York and Etobicoke may divert leaf and yard waste from their facilities to the Keele Valley site in the future.

Other Residential Waste Diversion

Reuse Centres and Activities

A number of reuse activities are ongoing throughout Metro Toronto. These include social service organizations involved in the reuse and repair of clothing, white goods, books, furniture and machinery, as well as an organization that is involved in promoting the diversion of edible food from disposal. Some of these activities include:

- Salvation Army and Goodwill Industries provide drop-off containers and trailers for reusable clothing, appliances and furniture. Goodwill Industries operates ten "Attended Donation Centres" and 20 stores for donating clothing and small items in the GTA. Their main headquarters are in Metro Toronto. Goodwill also operates a training centre for adults who face employment barriers. This centre runs a number of vocational training programs which encourage "reuse" such as: mattress refurbishing; small engines repair (i.e. snowmobiles, lawn mowers, etc.); and furniture repair. In 1992, Goodwill collected about 10,000 tonnes of material in the GTA.

  Goodwill is interested in pursuing joint projects with municipalities interested in collecting textiles and household goods. An example of such a cooperative arrangement exists in Mississauga. Laidlaw Waste Systems is the City of Mississauga's recycling contractor. They provide textile collection through the Blue Box program and provides the material to Goodwill Industries. Goodwill sorts the materials and prepares them for resale at their retail stores.

- St. Vincent de Paul Society organizes textile collections through individual parishes of the Catholic Church;

- The ReUze Centre in Scarborough is privately operated. The centre was opened by two former renovators in April 1992. A grant of $237,000 was received from the MOEE (through the Industrial Waste Diversion Program).

  The ReUze Centre was modeled on similar operations in North America. (A similar salvage operation in Vermont is operating at a profit in their first year of operation). Items accepted and resold at the ReUze centre include cabinets, doors, electrical supplies, floor coverings, hardware, heating supplies, plumbing fixtures, windows and standard building materials such as drywall, lumber and plywood. The centre receives about 100 tons per month. (Diversion estimates to follow.) The average selling price for materials is about 75% less than if purchased new.

- Second Harvest is a Metro Toronto based non-profit organization that acts as a broker between sources of surplus, perishable food and social service organizations that can use it. This grassroots organization employs 8 people and operates on a $430,000 annual operations budget (most of the funding comes from corporations and foundations).

  Second Harvest receives food from catered events, retailers, manufacturers, grocery stores, restaurants, hotels, hospitals, convention facilities, corporate cafeterias, bakeries, etc. Staff and volunteers locate, collect and deliver perishable food to various social service agencies within the GTA. The organization is currently working with Transport Canada and health authorities to collect surplus milk and other packaged food from Air Canada and Cara Foods. In 1992, Second Harvest diverted 500 tons of food to social service organizations.

- Goods Exchange Days: East York has organized goods exchange days. Quantification of diversion from goods exchange days is not carried out, but tonnages are expected to be relatively low.

Household Hazardous Waste Program

Metro Toronto operates ten permanent HHW depots - eight in Metro, one at the Keele Valley landfill and one at the Brock West landfill. These depots are open two days a week and are available for Metro, Durham and York residents only. Material is managed by Laidlaw Environmental Services removes it for proper disposal.

Metro also operates two toxic taxis. The Toxic Taxi provides collection services six days per week to residents with a minimum of 10 litres of HHW requiring disposal. The HHW is then transported to the Dufferin depot for storage and later managed by Laidlaw.

The following wastes were collected at the HHW depots or through the Toxic Taxi in 1990 and 1991. The values include York and Durham HHW drop-off.

Waste Type	1990	1991
Hazardous Waste (tonnes)	430.2	702.0
Motor Oil (tonnes)	17.4	68.0
Car Batteries (tonnes)	63.6	105.8
Propane Tanks (tonnes)	1.9	7.1
Total (tonnes)	513.2	882.9

White Goods

City of Toronto, East York, Etobicoke, and York offer residents curbside collection of white goods. Etobicoke also has a drop-off depot. White goods collection vehicles used by Etobicoke are equipped with chloroflorocarbons (CFC) recovery systems. CFC's are recovered where possible and white goods are shredded and recycled.

Promotion and Education

Metro Toronto has published a waste reduction guide (second edition) called "Your Guide To Waste Reduction and Recycling in Metropolitan Toronto". The guide is intended to help residents in reducing, reusing and recycling waste. Contents include: the locations of recycling depots, information on what to do with specific materials (household hazardous waste, furniture, grass clippings, etc.), and a listing of local charitable organizations and reuse centres.

Promotional videos, office paper recycling guides, educational kits, waste reduction and recycling plans, and markets directories, all developed by Metro Toronto, are available to encourage the IC&I sector to adopt responsible waste management practices.

Metro Toronto operates a general information hotline on waste reduction and provides funding support to Ontario Recycling Information Service which provides information over the phone and maintains a resource library. (Metro funding for this service has been withdrawn in 1993). In addition, the Recycling Council of Ontario started an anti-junk mail campaign, encouraging residents to choose not to have junk mail delivered.

Material Recycling Facilities (MRFs)

Metropolitan Toronto had three MRFs processing municipal recyclables in 1992. These include a private and a public facility - both in downtown Toronto, and a third facility in Downsview.

CRinc

The CRinc MRF on Commissioners Street began operation in May, 1992 to process container materials (glass, plastics, cans, etc.). This facility, located on the site of the former Commissioners St. incinerator, is owned by Metro Toronto and operated under contract by CRinc. The building is 1,394 square metres in size. The capital cost of the building was $1.4 million, and the equipment capital cost was $2.3 million. The total annual operating budget is $1.8 million.

The annual design throughput capacity is 25,000 tonnes/year. In the last eight months of 1992, the MRF processed 22,000 tonnes of recyclables. Of this, approximately 10% was residue and non-recyclable materials such as unmarketable glass, string, ceramics, etc. The facility operated 16 hours, 5 days per week with a staff of 30.

QUNO

The second facility is owned by QUNO (formerly Quebec and Ontario Paper), and has operated through contract with Metro Toronto to process residential recyclables since November, 1988. This facility is also located on Commissioners Street, and is approximately 929 square metres in size. The capital cost of the equipment used at the facility was $500,000. The operating cost is approximately $37.60 per tonne.

QUNO operated 24 hours, 5 days per week, processing 37,740 tonnes of fibres and container materials in 1992. Of this total, 6 to 7% was fibre residue, and 20% was commingled glass residue, due to transfer breakage. The facility operated at capacity in 1992, and had 21 processing staff and one administrative staff, for a total of 22 staff members. In April 1993, QUNO ceased processing Metro container materials. Containers previously processed at QUNO are now processed at the Commissioners Street CRinc facility. QUNO continues to process fibre materials.

Dufferin MRF

The third processing facility is situated at the Dufferin Transfer Station in Downsview. This facility is owned by Metro Toronto ahd operated by QUNO. In 1992, there were six processing staff and one administrative staff, for a total of seven staff members. The operating cost is approximately $15 per tonne.

In 1992, the MRF processed approximately 18,870 tonnes of recyclables, of which 4 to 5% was residue. The MRF operated on a single 8 hour shift, 5 days per week, and was operating at capacity in 1992.

5.2.2.2 Metro Toronto - Diversion Achieved

In 1992, approximately 208,632 tonnes of residential waste were diverted from landfill. The residential diversion rate was therefore estimated approximately 19%. This is an underestimate of actual residential waste diversion, as the quantities of "Residential" waste on which this estimate was based include some commercial and municipal (street sweepings, etc.) waste, which cannot be broken out of the residential total at this time. The actual residential diversion rate is somewhat higher than 19%.

5.2.2.3 Metro Toronto - Costs

The total cost for the residential waste diversion program in 1992 was $30,268,613. Blue Box collection costs for Metro Toronto were approximately $13,798,850, with an additional $7,324,005 for processing. Blue Box revenues totalled $1,273,740, for a net system cost of $19,849,115. Other diversion program costs totalled $10,419,498.

Each municipality within Metro Toronto administers its own 3Rs program while Metro Toronto assumes the financial responsibility.

The tipping fee for Metro Toronto landfills was approximately $150 per tonne in 1992. If loads contained any recyclables, a higher rate of $300 per tonne was charged. Tipping fees were lowered to $90/tonne in May 1993.

The total system cost (diversion plus disposal) for the Existing system is estimated at $114 to $152 million, based on a disposal rate of $37 to $80/tonne. This range was used to consider both the cost and price of disposal in cost estimates. This averages $131 to $174/household/year. The diversion system is estimated to make up $35/household/year of this total.

5.2.3 York Region

5.2.3.1 York Region - Existing Residential 3Rs System Overview

In 1992, an estimated 198,313 tonnes of residential waste were generated in York Region. Of this, 56,163 tonnes were diverted and 142,150 tonnes disposed for an estimated residential waste diversion rate of 28.3%. Estimated residential waste diversion was made up of the following activities:

Dry recyclables	25,433 tonnes
Other materials	7,458 tonnes
Leaf and yard waste	16,300 tonnes
Household wet waste through backyard composters	6,972 tonnes
TOTAL DIVERTED 1992	56,163 tonnes

This information is summarized in Table 5.15.

In 1992, residential recycling services in York Region consisted of the following activities:

- 159,507 households were provided with curbside collection of Blue Box recyclables. All municipalities offered curbside collection;
- Markham also collected materials from recycling depots - no figures on exact quantities are available. The depots accepted all Blue Box materials, plus boxboard, mixed paper, scrap metal and tires. Whitchurch-Stouffville was the only other municipality reporting any depot collection;

TABLE 5.15
SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE
YORK REGION
1992

Regional Characteristics	
Regional Population	522,248
Total Number of Households	161,556
- single family - multi-family - other	128,061 18,306 15,189
Households served by curbside	159,507
Number of backyard composters distributed	29,050
Residential Material Diverted in 1992	
Blue Box	25,433 tonnes
Other materials	7,458 tonnes
Leaf and yard waste collection and composting	16,300 tonnes
Diversion through backyard composters	6,972 tonnes
Total residential waste diverted	56,163 tonnes
Residential Waste Diversion Summary	
Waste generated	198,313 tonnes
Waste diverted	56,163 tonnes
Waste disposed	142,150 tonnes
Waste diversion rate	28.3%

Source: Diversion data were obtained through a survey of the nine lower tier municipalities in York Region, and also through discussions with operators of the Richmond Hill and Markham MRF's, and the Regional leaf and yard waste composting site.
- See Metro rate on backyard composters.
- Household and population data from HSA.

- 29,050 backyard composters were distributed;
- extensive promotion and education programs;
- one Regional leaf and yard waste composting site;
- seasonal curbside collection of leaf and yard waste and drop-off at the Regional composting site
- periodic HHW collection days;
- two mobile HHW depots;
- periodic curbside collection of white goods;
- drop-off depot for white goods collection at King Township landfill (for King residents); and
- two MRFs, one owned by Markham and the other owned by Richmond Hill. Both are operated by Miller Waste Systems Ltd.;

These activities are described under a number of headings below.

Residential Recycling and Collection

In 1992, York Region contained an estimated 161,556 households. Of these, 128,061 were single-family households, 18,306 were high rise apartments and 15,189 were other households, including semi-row townhouses, low-rise apartments, mobile homes etc.

In 1992 an estimated 159,507 single, multi-family and rural households in York Region were served with some form of recyclables collection. Each municipality within the Region is solely responsible for the implementation and operation of its own curbside recycling program.

The following tonnages of materials were collected from residential recycling programs in the Region in 1992:

- 16,641 tonnes of ONP and OMG (comingled);
- 677 tonnes of OCC;
- 75 tonnes of telephone directories;

- 69 tonnes of mixed paper
- 91 tonnes of aluminum;
- 2,796 of tinplate steel
- 5,770 tonnes of glass;
- 282 tonnes of PET;
- 404 tonnes of high density polyethylene (HDPE); and
- 6,087 tonnes of metal, wood, tires, textiles etc.

Residential Household Composting

At the end of 1992, 29,050 backyard composting units had been distributed in York Region. It is estimated that 6,972 tonnes of organic material were diverted through this program in 1992, assuming a diversion rate of 240 kg/composter/year.

Backyard composting is the responsibility of the lower tier municipalities, although the Region helped with some promotion. Most of the municipalities charged a fee equivalent to one third the cost of the unit plus an administration charge for distribution of backyard composters to residents. In addition to regular municipal distribution, composters were sold at three retail outlets. Richmond Hill and Markham hired students to conduct a door-to-door sales and delivery campaign. Each municipality supports its backyard composting program with a variety of promotional material, including flyers, brochures, calendars and educational seminars.

Residential Leaf and Yard Waste Collection/Composting Facilities

In 1992, collection of "green" waste in York Region totalled 16,300 tonnes. A central yard waste composting facility was opened by the Region in 1990. The facility also accepts grass clippings, shrubs, branches and garden plants from residents and commercial businesses. Residents deliver waste free, while commercial operators are charged $25 per tonne.

York Region contracted the provision and operation of the Regional leaf and yard waste composting operation to Miller Waste Systems. The facility began receiving material in the fall of 1990.

Almost all the equipment used on site is owned and maintained by the Region of York. Equipment includes a SCARRAB windrow turner, front-end loader, chipper and a trommel screen. Based on MOEE funding information, the total cost of the equipment was approximately $830,000.

Staffing requirements vary according to the season. During the spring and fall, six to eight employees are required, dropping to three people in non-peak months.

The contractor assumes responsibility for marketing of the finished compost, although 75% of any revenue received must be returned to York Region. In 1991, finished material was given away to the public. Local municipalities were charged $10/tonne to use the material in 1991. At the end of 1992, a significant amount of finished compost was being stockpiled at the site.

Other Residential Waste Diversion

Reuse Activities

No residential reuse centres (other than social service organizations discussed in the Metro Toronto section) currently operate in the York Region. Richmond Hill conducts goods exchange days.

Household Hazardous Waste (HHW) Program

In York Region, periodic HHW collection days have been conducted in Aurora, Newmarket, East Gwillimbury, Bradford, Richmond Hill, Newmarket, and Whitchurch-Stouffville . Wastes collected at these events were managed by Laidlaw.

In 1992, Richmond Hill collected approximately 252 batteries and 28 tonnes of HHW with a mobile HHW depot.

White Goods

All area municipalities provide some curbside collection to residents (once per week, per month or per year) for white goods. Only King Township reported operating a drop-off service at its landfill.

Richmond Hill now reclaims CFC and compressor oil and sends units for shredding and recycling. Approximately 54 tonnes of white goods were collected by Markham in 1992. Quantities collected by other municipalities were not available.

Residential Promotion and Education

Only HHW and yard waste programs are promoted at the Regional level. Other programs are left to the municipalities. The municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers. Richmond Hill and Markham conducted extensive door to door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools.

Public Sector Material Recovery Facilities (MRFs)

Recyclables from all nine area municipalities in York Region are processed at one of two MRFs; one in the Town of Markham and the other in the Town of Richmond Hill.

Markham MRF

The Markham MRF is owned by Markham and operated by Miller Waste Systems Ltd. It services recyclables from Markham, Aurora, King and Vaughan. The MRF began operation in 1988 as a temporary processing facility, and has been operating on this basis since that time.

In 1992, approximately 15,855 tonnes of recyclables, including newspapers and container materials, were processed. The facility operated 9.5 hours per day, 5 days per week with four staff members. Residue quantities were less than 1%, since most of the recyclables sorting and contaminant control is done during collection.

The Region is currently in the process of establishing a larger, Regional processing facility located in Markham to service all area municipalities.

Richmond Hill MRF

This MRF is located in Richmond Hill, owned by the Town, and also operated by Miller Waste Systems Ltd. It serves Richmond Hill, Newmarket, East Gwillimbury and Whitchurch-Stouffville.

The facility operates 9.5 hours per day, 5 days per week and in 1992, processed about 8,377 tonnes (excluding East Gwillimbury) of residential recyclables from within the Region, with a daily staff of two or three. Residue averaged less than 1% of total throughput tonnage.

Processing costs for the Richmond Hill MRF for 1992 were reported to be $502,744. This MRF will be replaced by a larger, Regional MRF in 1993.

Other

Georgina collected about 1,200 tonnes of Blue Box materials that were sent outside the Region for sorting and further processing.

5.2.3.2 York Region - Diversion Achieved

In 1992, approximately 56,163 tonnes of residential waste were diverted from landfill. The residential diversion rate was therefore approximately 28.3%.

5.2.3.3 York Region - Costs

The total cost for the residential waste diversion program in 1992 was $6,449,606. Blue Box collection costs for York Region were approximately $2,037,180, with an additional $2,332,035 for processing. Blue Box revenues totalled $884,565, for a net system cost of $3,484,650. Other diversion program costs totalled $1,889,156. (Reference: Municipal Finance Technical Appendix).

The Region assumed financial responsibility for the HHW and centralized yard waste composting programs. Individual municipalities were responsible for all other recycling programs. Most of York's waste was disposed at the Keele Valley landfill site operated by Metro. Tipping fees for the landfill were $152.25/tonne in 1992 and $300/tonne if the load contained any recyclables. Tipping fees were lowered to $90/tonne in May, 1993.

The total system cost (diversion plus disposal) for the Existing system is estimated at approximately $20.6 to $264 million/year, based on a disposal rate of $40 to $80/tonne. This translates to a cost of $128 to $163/household/year. Approximately $40/household/year is related to the diversion system.

5.2.4 Peel Region

5.2.4.1 Existing Residential 3Rs System Overview

In 1992, an estimated 317,331 tonnes of residential waste were generated in Peel Region. Of this, 64,002 tonnes were diverted and 253,329 tonnes disposed for an estimated residential waste diversion rate of 20.2%. Estimated residential waste diversion was made up of the following activities:

Blue Box curbside	34,867 tonnes
Dry Recyclables from depots	5,793 tonnes
Other Dry Recyclables diverted	1,375 tonnes
Leaf and yard waste	7,661 tonnes
Household wet waste through backyard composters	13,641 tonnes
Household Hazardous Waste	665 tonnes
TOTAL DIVERTED 1992	64,002 tonnes

This information is summarized in Table 5.16.

In 1992, residential recycling services in Peel Region consisted of the following activities:

- residential curbside recycling services to 228,300 households;
- drop-off depots at Britannia Road landfill;
- 56,840 backyard composters;
- leaf and yard waste composting site in Brampton;
- composting area at Britannia Road landfill site;
- compost demonstration site for pilot wet-dry projects;
- compost area at Caledon landfill;

TABLE 5.16

SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE PEEL REGION
1992

Regional Characteristics	
Regional Population	763,000
Total Number of Households	240,228
- single family - multi-family - other	118,927 64,439 56,862
Households served by curbside	228,300
Number of backyard composters distributed	56,839
Residential Material Diverted in 1992	
Blue Box	34,867 tonnes
Depots (Blue Box materials)	5.793 tonnes
Other materials	2,040 tonnes
Leaf and yard waste collection and composting	7,661 tonnes
Diversion through backyard composters	13,641 tonnes
Total residential waste diverted	64,002 tonnes
Residential Waste Diversion Summary	
Waste generated	317,331 tonnes
Waste diverted	64,002 tonnes
Waste disposed	253,329 tonnes
Waste diversion rate	20.2%

Source: Household and population data obtained from HSA
Diversion data obtained from Regional and Municipal staff
Backyard composter diversion data estimated by RIS staff using diversion rate of 240 kg/composter/year (measured in Region of Durham Study)

- a Regional salvage centre in Caledon;
- Albion Reusable Goods Exchange;
- Williams Parkway Reusable Goods Exchange in Brampton;
- one permanent household hazardous waste depot at the Britannia Road landfill;
- once-a-year HHW collection at Bolton Community Centre;
- HHW depot located in City of Brampton;
- drop-off depot for white goods in Caledon;
- curbside pick-up of white goods in Brampton and Mississauga;
- extensive promotion and education program;
- MRF/transfer station in Bolton for Caledon material;
- recyclable material processing at the Laidlaw MRF in Mississauga for Mississauga and Brampton material; and
- some curbside collection of leaf and yard waste (with the exception of those communities in Mississauga north of Dundas Street).

The activities are described under a number of headings in the following text:

Residential Recycling and Collection

In 1992, Peel Region contained an estimated 240,228 households. Of these, 118,927 were single-family households, 64,439 were high rise apartments and 56,862 were other households, including semi-row townhouses, low-rise apartments, mobile homes etc. There were 763,000 residents in the Region in 1992.

In 1992 an estimate of 228,300 single, multi-family and rural households in Peel Region were served with some form of recyclables collection. Each municipality in Peel Region administers its own Blue Box program which results in the collection of different

recyclable materials in each municipality. In 1992, approximately 35,939 tonnes of recyclables were collected through residential curbside programs. The average weekly participation rate for the Blue Box program has been estimated at 75-80%.

Peel Region operates a drop-off recycling depot at the Britannia Landfill Site. Materials collected include residential recyclables, ferrous metal, wood waste, drywall, all paper and plastic grades, and any other materials which have been banned. A total of 5,793 tonnes of recyclable materials were collected through drop-off depots in 1992. A total of 40,660 tonnes of dry recyclables were collected from both the residential curbside and depot recycling collection programs.

The following tonnages of materials were collected from residential Blue Box programs and drop-off depots in the Region:

- 21,534 tonnes of ONP and OMG (commingled);
- 1,234 tonnes of OCC;
- 712 tonnes of telephone directories;
- 469 tonnes of mixed paper;
- 6,137 tonnes of aluminum and steel (commingled);
- 6,674 tonnes of glass;
- 694 tonnes of plastic;
- 3,206 tonnes of metal, wood, tires, textiles, etc.

Residential Household Composting

At the end of 1992, 56,839 backyard composting units had been distributed by Peel Region. In 1992 the program was updated to allow for the sale of subsidized backyard composters through established retail operations It is estimated that 13,641 tonnes of organic material were diverted through this program in 1992, assuming a diversion rate of 240 kg/composter/year measured in a pilot project in Durham Region. A recent survey showed that 81% of the home composters sold between 1990 and 1992 are still in use.

Staffing to administer the backyard composting program consists of approximately 60% of a coordinator's time. Two summer students also provide assistance.

The Region's promotional budget for backyard composting is slightly more than $0.20 for each single family household. In 1992 a brochure was published and distributed to about 185,000 non-apartment households. Newspaper advertisements have been utilized and a telephone hotline is available for composting information.

A worm composting pilot project was carried out in the Region in 1991 and 1992. Two-hundred and fifty (250) vermi-composters were distributed to multi-family units.

Residential Leaf and Yard Waste Collection/Composting Facilities

Curbside collection of leaf and yard waste is limited in Peel Region. The City of Brampton collects leaves only in the fall, and some leaf and yard waste collection occurs in the urban areas of Caledon. In 1992, curbside collection of leaf and yard waste in Peel Region totalled 7,661 tonnes. Leaf and yard waste is processed in three centralized windrow composting facilities in Brampton, Britannia Road landfill and Caledon landfill. Equipment used on-site includes front end loaders, SCAT machines, a tub grinder and a trommel screen. The maximum staffing at any of the sites is two people. In 1992 the Region conducted an experiment at the Britannia Road landfill. Instead of composting, the leaves were mixed in with topsoil.

Other Residential Waste Diversion

Reuse Centres and Activities

Peel Region operates a salvage centre in Caledon that accepts old furniture, appliances and any non-hazardous material. Residents are encouraged to bring goods and to take items home with them free of charge. The centre includes a textile drop-off box for Goodwill.

Approximately 3,500 items were brought to the site in 1992, of which 86% were reused by residents. Municipal officials estimate that the salvage centre diverted approximately 75 tons of material from landfill in 1992.

There are two additional re-use centres operating in the Peel Region, including:

- the Albion Reusable Goods Exchange which diverted approximately 194 tons of waste in 1992; and

- the Williams Parkway Reusable Goods Exchange in Brampton which diverted over 31 tons of waste in 1992.

Household Hazardous Waste (HHW) Program

Peel Region operates one large permanent HHW depot at the Britannia landfill and a once-a-year HHW collection at the Bolton Community Centre. A third HHW collection site in Albion closed in 1992 pending full MOEE approval.

In addition to the Regional facilities, an HHW depot is located in the City of Brampton. The depots are operated on behalf of the Region of Peel and member municipalities by Laidlaw Environmental Services.

The following wastes were collected at the depots or on waste collection days:

- 385 tonnes hazardous waste;
- 2,240 propane tank units;
- 168 tonnes motor oil;
- 7,258 car battery units.

White Goods

Caledon provides a drop-off depot for white goods. Weights of material diverted were not available. Brampton offers daily white goods pick-up as well as a drop-off depot. This led to diversion of 381 tonnes (215 tones scrap metal/166 tonnes reuse) in 1992. Mississauga offers curbside pick-up of white goods, capturing approximately 507 tonnes in 1992.

Collection vehicles used by Brampton and Mississauga are equipped for curbside CFC extraction and the recovered CFC's are sold to DuPont. Brampton also removes and recycles compressor oil.

Residential Promotion and Education

In 1992, a brochure about backyard composting was published and distributed to about 185,000 non-apartment households. Newspaper advertisements have been utilized, and a telephone hotline is available for composting information. Peel Region also runs an extensive IC&I waste reduction campaign.

Public Sector Material Recycling Facilities (MRFs)

One public sector MRF/transfer station is operated in Bolton for Caledon. It operates 8 hours/day, 2 days per week, for a total of 832 operating hours per year. Its current annual throughput is 2,087 tonnes. Materials accepted include ONP, PET, glass, aluminum and steel cans. Materials are inventoried and sold directly to brokers. The facility reports an approximate 1% residue rate. The facility is operated by a total of two staff, with an annual labour cost of $15,000 and an additional $5,000 for other unspecified operating expenses (Personal Communication with Dawn Moffat, Recycling Co-ordinator, Town of Caledon, March 1993).

Laidlaw owns and operates a large MRF in Mississauga, which processes all the material collected from the municipal curbside and apartment recycling programs in Mississauga and Brampton, in addition to materials from the IC&I sector. The Laidlaw MRF in Mississauga began operation in 1986. This facility processes fibre (ONP, OCC, OMG and telephone directories), container materials (glass, plastics, cans, etc.), and textiles. The building is 22,500 square feet in size. The total capital cost of the building and the equipment was $3.4 million.

In 1992, the MRF processed 23,172 tonnes of residential recyclables. Of this, approximately 5% was residue and non-recyclable materials. The facility operated 16 hours, 5 days per week with a staff of eight per shift.

The annual design throughput capacity is 33,000 tonnes/year, and the facility was reported to be operating at capacity (with processing of IC&I in addition to residential recyclables).

5.2.4.2 Peel Region - Diversion Achieved

In 1992, approximately 64,002 tonnes of residential waste were diverted from landfill. The residential diversion rate was therefore approximately 20%.

5.2.4.3 Peel Region - Costs

The total cost for the residential waste diversion program in 1992 was $6,648,006. Blue Box collection costs for Peel Region were approximately $3,745,400, with an additional $1,872,700 for processing. Blue Box revenues totalled $823,988, for a net system cost of $4,794,112. Other diversion program costs totalled $1,853,894. (Reference: Municipal Finance Technical Appendix).

Financial responsibility for the 3Rs programs lies with the area municipalities while Peel Region is responsible for HHW waste collection, reusable goods exchange facilities and composter distribution. The Region provided funding in 1992 totalling $4,374,000 for the residential 3Rs programs.

Tipping fees for the three landfills were $150/tonne in 1992. Tipping fees were lowered to $80/tonne in May, 1993.

Peel Resource Recovery Incorporated (PRRI) operate an incinerator in the Region which is permitted to receive residential waste. PRRI and the Region have a 20 year agreement regarding the quantities of waste to be delivered to the incinerator. The costs paid to PRRI are $69/tonne for the first 160,000 tonnes of waste received each year, and $6/tonne for waste in excess of this amount. IC&I waste can also be accepted at the incinerator.

The total system cost (diversion plus disposal) for the Existing system is approximately $35 to $43 million, based on disposal costs of $70 to $98/tonne. This translates to approximately $149 to $179/household/year, of which $33/household/year is related to the diversion system. (See Cost Technical Appendix for details.)

5.2.5 Halton Region

5.2.5.1 Halton Region - Existing Residential 3Rs System Overview

In 1992, an estimated 137,018 tonnes of residential waste were generated in Halton Region. Of this, 42,218 tonnes were diverted and 88,800 tonnes disposed for an estimated residential waste diversion rate of 35%. Estimated residential waste diversion was made up of the following activities:

Blue Box curbside	23,450 tonnes
Dry Recyclables from depots	3,600 tonnes
Leaf and yard waste	15,000 tonnes
Household wet waste through backyard composters	6,168 tonnes
TOTAL DIVERTED 1992	42,218 tonnes

This information is summarized in Table 5.17.

In 1992, residential recycling services in Halton Region consisted of the following activities:

- residential curbside recycling services to 116,320 households;
- four drop-off depots throughout Region;
- mandatory participation in recycling programs;
- Regional MRF to process recyclables;
- 25,700 backyard composters;
- leaf and yard waste composting at several different privately owned facilities throughout the Region and municipal site in Oakville;
- WASTEWISE goods exchange and recycling depot;
- two permanent HHW depots operated by Region;
- curbside and drop-off services for white goods; and
- extensive promotion and education program.

TABLE 5.17
SUMMARY OF EXISTING RESIDENTIAL WASTE DIVERSION SYSTEM PERFORMANCE
HALTON REGION
1992

Regional Characteristics	
Regional Population	318,893
Total Number of Households	109,680
- single family - multi-family - other	72,008 16,080 21,592
Households served by curbside	109,680
Number of backyard composters distributed	25,700
Residential Material Diverted in 1992	
Blue Box	23,450 tonnes
Depots (Blue Box materials)	3,600 tonnes
Leaf and yard waste collection and composting	15,000 tonnes
Diversion through backyard composters	6,168 tonnes
Total residential waste diverted	48,218 tonnes
Residential Waste Diversion Summary	
Waste generated	137,018
Waste diverted	48,218
Waste disposed	88,800
Waste diversion rate	35.2%

Source: Household and population data obtained from HSA
Diversion data obtained from Regional and Municipal staff
Backyard composter diversion data estimated by RIS staff using diversion rate of 240 kg/composter/year (measured in Region of Durham Study)

These activities are described below under a number of headings.

Residential Recycling and Collection

In 1992, Halton Region contained an estimated 109,680 households. Of these, 72,008 were single-family households, 16,080 were multi family households and 21,592 other households. There were 318,893 residents in the Region in 1992.

In 1992, all households received curbside collection. Curbside recycling is organized on a Regional level and is contracted out to a private hauler. In 1992, approximately 23,450 tonnes of recyclables were collected through residential curbside programs. The participation rate for the Blue Box program has been reported at 100%, due to the mandatory recycling requirement in the Region.

There are four drop-off container stations in the Halton Region which accept ONP, OCC, glass, scrap metal, drywall and green wastes. In 1992, the four drop-off container stations diverted 3,600 tonnes of material.

The following tonnages of materials were collected from residential Blue Box programs and drop-off depots in the Halton Region in 1992:

- 15,923 tonnes of ONP and OMG (commingled);
- 2,177 tonnes of OCC;
- 3,650 tonnes of Aluminum, Steel and Plastic (commingled);
- 4,944 tonnes of Glass; and
- 2,268 tonnes of Green Waste.

Residential Household Composting

At the end of 1992, 25,700 backyard composting units had been distributed in Halton Region. Composters were distributed to residents by each of the individual municipalities. It is estimated that 6,168 tonnes of organic material were diverted through this program in 1992, assuming a diversion rate of 240 kg/composter/year.

Residential Leaf and Yard Waste Collection/Composting Facilities

In 1992, collection of leaf and yard waste in Halton Region totalled 15,000 tonnes. Leaf and yard waste collected at the Region's transfer stations were delivered to Scott's Farms in Milton as were leaf and yard wastes collected in Halton Hills. Oakville operates its own composting site for leaf and yard waste and Burlington and Milton send their collected leaf and yard wastes to local farmers and landscape companies. Burlington provides a seasonal drop-off service for brush and Christmas trees which the City chips and offers back to the public or uses in parks. Milton also collected pumpkins following Halloween and delivered them to a hog farmer for animal feed.

Other Residential Waste Diversion

Reuse Centres and Activities

A community-based resource centre and diversion facility called WASTEWISE is staffed by a combination of paid employees and volunteers. It serves as:

1. an education centre and information service;

2. a reuse centre accepting and selling office furniture, household goods etc.;

3. a repair area for broken household appliances, power tools and equipment; and

4. a recycling depot for materials not accepted by the Blue Box program, including six grades of plastics, eight grades of paper, scrap metal, textiles, aggregate, egg cartons, rubber, film canisters, coat hangers etc.

Household Hazardous Waste (HHW) Program

The Region operates two permanent HHW depots: one in Milton open three days/week and staffed by the Region, the other in Burlington, open one day a week and operated mainly by Laidlaw Environmental Services. In 1992 it is estimated that the two HHW facilities diverted the following quantities of waste:

- 192,200 litres of HHW;
- 2,977 vehicle batteries;
- 1,285 propane tanks; and
- 45 fire extinguishers.

White Goods

Halton Region has both curbside and drop-off services for white goods. In 1992, white goods collection was estimated by the Region to total 370 tonnes. This material was delivered to scrap dealers for shredding and recycling.

Residential Promotion and Education

Halton Region and the area municipalities are jointly responsible for 3Rs education and promotion, except for the HHW program which is promoted by the Region. Municipalities conducted advertising, seminars and open houses to promote backyard composting. Halton is conducting a survey in 1993 to determine the community's interest in backyard composting. WASTEWISE also provided education and information and is producing a guide on starting a community resource centre.

Public Sector Material Recovery Facilities (MRFs)

In 1992, all of Halton's collected recyclable materials were processed at the Regional MRF in Oakville. This facility was owned by Halton Region and operated under contract by Halton Recycled Resources Inc. The facility was designed to process 30,000 tonnes/year of materials and in 1992, received 25,000 tonnes of recyclables for processing. The facility operated 24 hours per day, 5 days per week with a daily staff of 36.

Generally, 3 to 5% of the material delivered for processing becomes residue for disposal. Gross operating costs for this facility were reported to be $1,250,000/annum, resulting in an estimated processing cost of $46.30/tonne.

5.2.5.2 Halton Region - Diversion Achieved

In 1992, approximately 48,218 tonnes of residential waste were diverted from landfill. The residential diversion rate was therefore approximately 35%.

5.2.5.3 Halton Region - Costs

The existing Halton waste management system costs an estimated \$193/household/year. Of this total, \$41/household/year is related to the diversion system, and \$152/household/year is related to disposal, based on a disposal rate of \$150/tonne.

5.3 Existing/Committed Residential 3Rs System Descriptions

The following describes the Existing/Committed residential 3Rs systems for each of the Regional municipalities. The Existing/Committed system for each Region was considered to encompass all facilities committed in the Region's capital funding budgets for the years 1993 to 1997, and any policy commitments at the local, Regional, provincial or federal level, which had been announced by the end of 1992. All diversion estimates presented in this section have been developed by applying the elements of the Existing/Committed system to the quantities of waste generated in 1992. The 1992 waste quantities have been used for illustrative purposes, to compare different systems, and illustrate the diversion achievable (as a percentage of the waste generated) when the Existing/Committed system is fully developed and operational.

An additional 5% source reduction is considered achievable by the year 2000. An additional 5% source reduction allowance is estimated to occur between 1992 and the year 2000, and is included in the residential waste diversion estimates. The 5% allowance is considered conservatively low, and is based on the following assumptions:

- Diversion of 50% of residential packaging waste (30% of residential waste generated) by the year 2000, if NAPP is successful. A conservative estimate that one quarter of the diversion (therefore 3.75%) would be achieved through source reduction.

- An additional 1% source reduction was assumed to be achievable through reuse activities.

A review of source reduction policies in a number of jurisdictions, and the results anticipated or achieved is summarized in Schedule A of the Service Technical Appendix. The City of Berkeley was the only jurisdiction which had actually measured source reduction results, and had achieved an estimated 3.3% source reduction. Based on the available data, an allowance of 5% for source reduction of residential waste was considered reasonable for all GTA Regions.

A number of industry-based product stewardship models and initiatives are being discussed in the Province at this time. If implemented, these plans will have a significant impact on the financial viability of municipal recycling programs, and will create incentives to increase residential waste diversion by municipalities. This is considered a potential waste diversion policy which would impact diversion in all Regions, but the impacts have not been estimated or included in the diversion estimates presented.

5.3.1 Durham Region

5.3.1.1 Durham Region - Existing/Committed Residential 3Rs System Overview

The Region is not proposing any significant new 3Rs programs in 1993 or within the next several years. The 1993 operating budget includes an allocation for approximately 4,000 new backyard composters, improvements to the existing MRF, and some additional depot service. Presently, there are no indications from the Province or other business groups of likely funding increases to accommodate any expansion of the 3Rs programs. Durham Region therefore has no plans to establish further facilities.

Implementation of the 3Rs regulations which will be promulgated under the *Environmental Protection Act* in the near future will not impact residential waste diversion practices by municipalities within the Region, as all municipalities meet the requirements of the proposed regulations for residential waste management. However, under the regulations, owners of buildings containing six or more units must provide recycling to residents. This will increase recycling by multi-family residents in the Region.

5.3.1.2 Durham Region - Existing/Committed Residential 3Rs System Description

A review of Durham Region's 1992 Development Charges Study and the 1993 Capital and Operating Budgets and five year forecast for Waste Diversion indicated the following:

- $2,788,400 has been allocated in the 1993 capital budget for the design and construction of an expansion to the Regional Recycling Centre;
- $702,000 has been allocated in the 1993 operating budget as a result of changes to programs related to the Recycling Centre and recycling programs, including extended hours of operation, additional staff, expansion of the Igloo program and deletion of the Toxic Taxi program; and

- $365,900 has been allocated in the 1993 operating budget as a result of the introduction of the sale of home composters, the Pickering Compost Study and new community events programs.

The Existing/Committed residential waste diversion system is assumed to include all of the components of the Existing system, and the addition of the following components:

- expansion of the Regional recycling centre;
- expansion of the Igloo program; and
- distribution of approximately 4,000 additional backyard composters.

5.3.1.3 Durham Region - Diversion Achieved

The Existing/Committed residential waste diversion system is estimated to divert 28% to 33% of the residential waste stream over time. The lower estimate assumes that minimal additional diversion occurs when the committed system is combined with the existing system. The higher estimate assumes that up to 5% source reduction of residential waste will be achieved over time with the full 5% occurring by the year 2000 and beyond. (Refer to the Service Technical Appendix for the basis of this estimate.)

5.3.1.4 Durham Region - Costs

The total system cost for the Existing/Committed system is estimated at $139/household/year. (Refer to the Cost Technical Appendix for the basis of this estimate.)

5.3.2 Metro Toronto

5.3.2.1 Metro Toronto - Existing/Committed Residential 3Rs System Overview

Metro Toronto will expand the range of materials collected in curbside recycling programs. As of October 1993, fine paper, pizza boxes and "gable top" polycoat cartons will be added to programs in Metro. This is estimated to divert an additional 3,500 tonnes per year through the Blue Box program.

Metro Toronto had proposed establishing two additional Regional MRF's in the five-year capital forecast. The proposed locations and capacities were not determined, nor is it

determined how they would interact with the three existing MRF's (CRinc, QUNO and Dufferin Street Transfer Station). Recycling Centre #2 may be required if Blue Box materials continue to be collected in a commingled state (City of Toronto, City of York, East York and all apartment materials are currently collected in a commingled state). The CRinc facility has adequate capacity for cans and plastics, but when glass is included (as in commingled programs) additional capacity is required. Metro Toronto staff have indicated that it is unlikely that Recycling Centre #3 will be constructed in the five year period.

Metro Toronto has proposed one new recycling depot, one HHW depot and additional roll-off containers for source separation of banned materials at landfills. Metro will also be distributing an additional 15,000 to 20,000 backyard composters to residents. The facilities may be constructed within the five year period. The recycling depot may be located at the Dufferin Transfer Station site, and would be a bi-level facility where recyclables would be dropped into different bins (similar to a facility in Region of Waterloo). Construction of the depot depends on future Toronto Transit Commission (TTC) plans for the area.

The five-year capital forecast includes $69 million for construction of a centralized composting facility, with capacity of 125,000 to 180,000 tonnes/year. Discussions with Metro Toronto staff indicate that construction of this facility is unlikely within the five year period. There is a proposal to retrofit the Fairfield digester at the Dufferin Transfer Station (capacity 50 tonnes/day) to process source separated organic waste from the IC&I sector.

Funding has also been committed to extend recycling to all remaining apartment buildings in Metro Toronto who currently do not have recycling service. As of the end of 1992, it was estimated that 65% of all apartment units in Metro Toronto received recycling services. The remaining 35% should receive service under the Existing/Committed system.

Implementation of the 3Rs regulations which will be promulgated under the *Waste Management Act* in the near future and will not impact residential waste diversion practices by municipalities within Metro Toronto, as all municipalities meet the requirements of the proposed regulations for residential waste management. Under the new regulations, municipalities of greater than 50,000 must provide curbside collection of leaf and yard waste. Metro Toronto's area municipalities meet this requirement. Regulations requiring owners of buildings containing more than six apartments to provide recycling to residents will increase the quantities of materials collected from multi-family buildings.

The product packaging stewardship initiatives discussed at the beginning of this section, although still in the initial stages, will create incentives to increased residential waste diversion by municipalities, if adopted and implemented in Ontario.

5.3.2.2 Metro Toronto - Existing/Committed Residential 3Rs System Description

A review of Metro Toronto's 1992 Development Charges Study and the 1993 Capital and Operating Budgets and five year forecast for Waste Diversion indicated the following:

- $69,697,000 (land and facility) allocated in the capital budget for a Regional Composting Plant. Approximately $27,000,000 has been allocated in the years 1994 to 1997 with the remaining costs budgeted post 1997. The capacity of the plant will be 125,000 to 180,000 tonnes per year. Discussions with Metro Toronto staff indicate that construction is unlikely to proceed within the five year period.

- $34,310,000 (land and facility) allocated in the capital budget for Recycling Centre #3. Approximately $9,000,000 has been allocated in the years 1994 to 1997 with the majority of the cost budgeted post 1997. Discussions with Metro staff indicate that construction of this facility will not proceed.

- $22,420,000 (facility only) allocated in the capital budget for Recycling Centre #2. Approximately $3,800,000 has been allocated in the years 1994 to 1997 with the majority of the costs budgeted post 1997. Discussions with Metro staff indicate that there are no firm plans to construct this facility.

- $4,281,000 allocated in the capital budget for a Recycling Depot. Approximately $1,031,000 has been allocated in 1993 with the majority of the costs budgeted in the years 1994 to 1996. Construction of this facility will depend on the outcome of negotiations with the TTC.

- $507,000 allocated in the capital budget for a HHW Depot. Approximately $330,000 has been allocated in 1993 with the remaining costs budgeted in the years 1994 and 1995.

- $180,000 allocated in the capital budget for additional market development, research and product testing associated with the Wet Collection and

Processing Program. The total program cost was estimated to be $2,761,000. It should be noted that the program is winding down.

- $1,185,000 allocated in the 1993 capital budget in association with the start up of recycling collection for the remaining 35% of multi-family units not receiving recycling services. The total cost of the program was approximately $13,811,000 of which the majority has been allocated prior to 1993.

- $1,185,000 allocated in the 1993 capital budget in association with the sale and distribution of Backyard Composters. The total cost of the program was approximately $8,260,000 of which the majority has been allocated prior to 1993.

- $124,000 allocated in the 1993 capital budget in association with Roll-Off Containers for Banned Material. The total cost of the containers is approximately $365,000. The remaining cost is allocated in 1994.

- $147,000 allocated in the 1993 capital budget in association with the prototype vehicles for recyclables. The total cost of the vehicle was approximately $489,000 of which the majority has been allocated prior to 1993.

- $196,000 allocated in the 1993 capital budget in association with tire recycling. The total cost of the program was approximately $292,000 of which $96,000 has been allocated prior to 1993.

- $1,449,000 allocated in the years 1994 to 1997 for the purchase of equipment and construction of a special facility. The total cost of the program is approximately $3,770,000 of which $2,321,000 has been allocated post 1997.

5.3.2.3 Metro Toronto - Diversion Achieved

Because many of the facilities listed in the Existing/Committed system are unlikely to proceed, diversion estimates were based on the activities that appeared likely to be implemented as of July 1993.

The Existing/Committed system is estimated to divert 21% to 26% of the residential waste stream. This estimate was based on addition of 3,500 tonnes of fibre material/year to the Blue Box system, and additional diversion through 15,000 to 20,000 backyard composters. Diversion through other facilities in the five-year capital forecast was not estimated, as the status of these projects is uncertain at this time. Impacts of any proposed product stewardship initiatives were not estimated. The higher estimate assumes that an increase of 5% source reduction will be achieved over time, with the full 5% value achieved by the year 2000.

5.3.2.4 Metro Toronto - Costs

The total system cost (diversion plus disposal) for the Existing/Committed system is estimated at $114.5 to $152.4 million/year based on disposal costs of $37 to $90/tonne. The disposal used considers both the cost and price of waste disposal. The estimated costs translate to $132 to $175/household/year. Approximately $35/household/year of the total is related to the diversion system.

5.3.3 York Region

5.3.3.1 York Region - Existing/Committed Residential 3Rs System Overview

No expansion in the range of materials collected in curbside recycling programs is planned at the Regional level. York Region is planning to build a new Regional MRF to replace the existing two facilities and to increase the levels of service in the HHW program and leaf and yard waste composting operations. Individual municipalities will also be distributing additional backyard composters to residents - exact numbers are not known, however. A privately owned in-vessel composting facility to be built in Newmarket has received MOEE approval and will accept up to 120,000 tonnes per year of organic residential waste of which up to 7,000 tonnes will come from Newmarket when operating in 1994. The facility would include an in-vessel composting system using an anaerobic process. When (if) built, it will be the first anaerobic composting system of its kind in North America. The Town is examining details for a three stream Wet/Dry collection system to supply this facility.

The Town of Markham is planning to operate a demonstration wet-dry (3-stream) project in Unionville, starting late in 1993. The project will involve approximately 2,500 households, and will demonstrate the potential for using a new truck design. Some delays have been experienced in the project.

Implementation of the 3Rs regulations which will be promulgated under the *Environmental Protection Act* in the near future will not impact residential waste diversion practices by municipalities within York Region, as the municipalities meet the source separation and backyard composting requirements of the proposed regulations for residential waste management. Under the new regulations, municipalities of greater than 50,000 must provide curbside collection of leaf and yard waste. It is unclear if existing leaf and yard waste management practices within the Region meet the requirements of the regulations. However, increased leaf and yard waste collection efforts are being considered at this time. Regulations requiring owners of buildings containing six or more units to provide recycling to residents will not have a major impact in York Region, because the majority of households are single family and only a minor proportion of the housing stock (8%) is in multi-family housing. Of this total, the fraction of units subject to the Regulations and the percentage of these units currently receiving recycling services is not known. Therefore, the incremental impacts of the Regulations are not known.

A number of product stewardship initiatives under discussion at this time may create incentives for increased residential waste diversion by municipalities if implemented.

5.3.3.2 York Region - Existing/Committed 3Rs System Description

A review of the Region of York Region's 1992 Development Charges Study and the 1993 Capital and Operating Budgets and five year forecast for Waste Diversion indicated the following:

- $2,224,000 has been allocated in the budget for a Regional MRF. The existing municipal facilities will terminate operations when the Regional facility commences operations;

- $445,100 has been allocated in the budget to cover increased payments to contractors as a result of an increase in the service level in the Household Hazardous Waste Program; and

- $116,000 has been allocated in the budget to cover an increase in the service level of the Organic Yard Waste operations.

For the net effects analysis, it was assumed that this Existing/Committed system included all of the components of the Existing system, with the addition of the following components:

- construction of a new Regional MRF that will replace the existing two MRFs in the Region; and

- distribution of additional backyard composters.

The following potential facilities were not included, due to uncertainty about their implementation at this time:

- construction of a privately-owned and operated in-vessel composting facility in the Newmarket area. The facility will have a capacity of 120,000 tonnes/year and will process waste primarily from the IC&I sector but will accept up to 7,000 tonnes per year of residential waste from Newmarket (because of the uncertainty regarding this facility, it was excluded from the analysis); and

- potential increase in quantities and types of materials recycled by the residential sector, if the proposed GPMC Product Stewardship model is implemented.

5.3.3.3 York Region - Diversion Achieved

On the basis that no additional programs are planned in the Region of York, the Existing/Committed residential waste diversion system is estimated to divert 28 to 33% of the residential waste stream. The lower estimate is based on diversion similar to the Existing system. The higher estimate assumes that source reduction will increase by 5% (measured against a 1992 baseline) over time and will reach the full 5% value by the year 2000. The lower estimate assumes no source reduction of residential waste over time.

5.3.3.4 York Region - Costs

The total system cost (diversion plus disposal) for the Existing/Committed system is $128 to $163/household/year based on a disposal cost of $40 to $90 tonne.

5.3.4 Peel Region

5.3.4.1 Peel Region - Existing/Committed Residential 3Rs System Overview

Peel Region is not proposing to expand the range of materials collected in curbside recycling programs. It has, however, proposed establishing seven new community recycling centres: three in Mississauga, two in Brampton and two in Caledon. It will also construct mini-recycling depots and satellite drop-off facilities for recycling. These will accept materials not currently collected in all of the municipal Blue Box programs such as plastics, mixed paper, and textiles and will also collect wood, clean fill, rubble and yard waste. The Region will also be distributing an additional 12,000 backyard composters to residents.

Implementation of the 3Rs regulations which will be promulgated under the *Environmental Protection Act* in the near future will not impact residential waste diversion practices by municipalities within the Region, as all municipalities meet the requirements of the proposed regulations for source separation and backyard composting of residential waste. Under the new regulations, municipalities of greater than 50,000 must provide curbside collection of leaf and yard waste. It is unclear if existing leaf and yard waste management practices within the Region, particularly for the City of Mississauga, meet the requirements of the regulations. However, increased leaf and yard waste collection efforts are being considered at this time, but were not included in diversion estimates for this system (because details were not available at the time of writing). Regulations requiring owners of buildings containing six or more units to provide recycling to residents will not have a major impact in Peel, because 70% of multi-family residents reportedly already participate in Blue Box programs. (Reference: Discussions with Regional Waste Reduction Staff.) Of the remaining 30%, it is not known how many of these would come under the requirements of the Regulations, therefore the incremental impacts of the Regulations are not known.

A number of product stewardship models are under consideration in the province at this time of implementation, these will create incentives to increase residential waste diversion by municipalities if implemented.

Capital funding has been included and budgeted to construct a central composting facility for Peel Region (this may be shared with Region of Halton). If approved, the Region would then move to a three-stream wet-dry collection system. Approval of the expenditure for a wet-dry system ($38.5 million) is somewhat uncertain, given the climate of restraint in Ontario at this time. If not approved in the near future, Regional staff feel that construction of the compost facility would be delayed until the year 2000 or 2001.

Responsibility for waste management in Peel Region is scheduled to be transferred from lower tier municipalities to the Region in January 1994.

5.3.4.2 Peel Region - Existing/Committed Residential 3Rs System Description

A review of Peel Region's 1992 Development Charges Study and the 1993 Capital and Operating Budgets and five-year forecast for Waste Diversion indicated the following:

- $500,000 has been allocated through 1997 for mini-recycling depots to service residents not serviced by existing programs.

- $10.5 million has been budgeted in 1993 for a new MRF to process residential recyclable materials from Blue Box collection, community recycling centres and new mini-depots. An additional $14.5 million has been allocated for 1994 through 1997.

- $5 million has been allocated between 1994 and 1997 for the design and construction of a recycling centre that would accept recyclables, HHW, reusable items and residential waste. Satellite drop-off facilities are also included in this budget item.

- $10 million has been budgeted in 1993, with an additional $28.5 million budgeted in 1994 to 1997, to establish a central composting facility with a capacity of 69,000 tonnes per year in Peel or in conjunction with Halton Region. The above costs include $10 million for the purchase of up to 150,000 household bins for implementation of a wet-dry system.

For the net effects analysis, it was assumed that the Existing/Committed system included all of the components of the Existing system, and the addition of the following components:

- construction of seven new community recycling centres and satellite depots;

- construction of new MRF to process residential recyclable materials from Blue Box collection, community recycling centres and new mini-depots;

- distribution of 12,000 additional backyard composters; and

- construction of a central composting facility.

5.3.4.3 Peel Region - Diversion Achieved

The Existing/Committed system is estimated to divert 23 to 30% of the residential waste stream. The higher estimate assumed that all backyard composters would achieve a diversion of 240 kg/year, and that source reduction will increase by 5 percent (measured against a 1992 baseline) over time, and would reach the full 5% value by the year 2000. The lower estimate assumed no source reduction of residential waste and that some backyard composters divert as little as 100 kg/year (value measured in Peel Region studies which are unpublished to date, and obtained through informal discussions with Peel Region staff). Based on informal discussions with Region of Peel staff, it has been assumed that two of the new recycling facilities will be constructed in the next five year period - one urban and one rural - the anticipated additional diversion from these facilities is estimated at 10,800 tonnes per year. This consists of 9,600 tonnes of recyclables and 1,200 tonnes of HHW. The overall anticipated diversion from these facilities plus the additional backyard composters is estimated at 13,880 tonnes per year.

5.3.4.4 Peel Region - Costs

The total system cost (diversion plus disposal) for the Existing/Committed system is \$42.5 million, based on a disposal cost of \$98/tonne (for incineration).

5.3.5 Halton Region

5.3.5.1 Halton Region - Existing/Committed Residential 3Rs System Overview

Halton Region expanded the range of materials collected in its Blue Box program to include five new materials: polystyrene, aluminum foil, HDPE, boxboard and fine paper in February 1993. It will also replace 12 existing igloos and install five new ones: four in Acton and one at the new GO station. The Region will distribute additional backyard composters to residents. Consideration is being given to constructing a central composting facility (possibly shared with Peel Region). The Town of Oakville has implemented a ban on collection of grass clippings.

Implementation of the 3Rs regulations which will be promulgated under the *Environmental Protection Act* in the near future will not impact residential waste diversion practices by municipalities within the Region, as all municipalities meet the requirements of the proposed regulations for residential waste management. Regulations requiring

owners of buildings containing six or more units to provide recycling to residents will not an impact in Halton Region, because all multi-family residents already participate in Blue Box programs.

Product stewardship initiatives under discussion in the Province at this time will create incentives to increased residential waste diversion by municipalities if implemented.

A review of Halton Region's 1992 Development Charges Study and the 1993 Capital and Operating Budgets and five year forecast for Waste Diversion indicated the following:

- $500,000 has been allocated in the 1993 capital budget for the design and construction of a new HHW Depot on location at the new Regional landfill site.

- $25,000,000 has been allocated for the design and construction of a Regional Composting facility. However, it is important to note that no provision has been made for the facility in the 1993 Capital Budget and five year forecast.

- $255,000 has been allocated in the Development Charges Study for the purchase of recycling vehicles over the period 1993 to 1997. However, the Operating Budget indicated that the vehicles would be sold (for approximately $255,000), in conjunction with the new tender contract for the collection of recyclables.

- $207,000 has been allocated in the operating budget as a result of a change in the service level of the HHW Depot in Burlington. The facility will operate each Saturday of the month as opposed to once per month as in prior years.

- $87,000 has been allocated in the operating budget as a result of the "Shared Responsibility Demonstration Project," whereby Halton Region is responsible for the collection of recyclables while the Province in conjunction with the Commercial/Industrial sector (Halton Recycled Resources) is responsible for provision of the materials recycling facility. The Province has provided a grant for the costs associated with the processing of the materials. The grant is for a one year term with an option to renew in 1994. The new facilities at Halton Recycled Resource's MRF have essentially allowed operations at the Region owned MRF in Oakville

to be terminated. A reduction of $145,000 in the 1993 operating budget has been estimated as a result of the closure of the Regional MRF.

- $34,300 has been allocated in the 1993 operating budget as the result of expansion to the Igloo Program. Seventeen new igloos will be purchased, twelve to replace existing units and five for new locations.

- $107,400 has been estimated in the 1993 operating budget as the result of additional Waste Reduction Education Programs and display materials design to increase participation rates.

In summary, the Existing/Committed system will include all of the components of the Existing system, and the addition of the following components:

- new MRF to begin operating in 1993, owned by Halton Recycled Resources and operated under contract to the Region. This is replacing the existing Regional MRF;

- five additional igloo sites: one in new GO station and four in Acton;

- reduction in curbside collection frequency to bi-weekly;

- reduction in container drop-off sites from four to one;

- five additional materials will be added to the residential Blue Box programs
- distribution of additional backyard composters;

- construction of a central composting facility (possibly in conjunction with Peel Region);

- potential increase in quantities and types of materials recycled by the residential sector, if product stewardship initiatives under discussion at this time are implemented. (This impact was not quantified); and

- ban on collection of grass clippings in Town of Oakville

5.3.5.2 Halton Region - Diversion Achieved

The Existing/Committed system is estimated to divert over 40% of the residential waste stream.

5.3.5.3 Halton Region - Costs

Specific items in the Region's five-year capital forecast are discussed in Section 5.3.5.1. The Existing/Committed Halton system costs an estimated $174/household/year.

5.4 Existing GTA IC&I System

5.4.1 Existing IC&I System Overview

The existing GTA IC&I system is considered to include all practices/facilities in place in GTA at the end of December 1992. At that time, waste diversion by the IC&I sector was carried out on a voluntary basis. Tipping fees at GTA landfills were $150/tonne for the private sector, causing significant export of waste to the U.S. A number of landfill material bans throughout the GTA also limited the materials which could be disposed in landfills (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.).

GTA Regional municipalities were involved in promotion/education of waste diversion to IC&I waste generators and provided information through a variety of means, including seminars, manuals, waste diversion hotlines, etc. Opportunities to recycle were provided to small IC&I generators through some municipally run depots. Two municipalities (Caledon and City of Toronto) provided municipal collection of IC&I recyclables. Processing of IC&I recyclables was also provided at some municipally-run MRFs.

Collection and processing of a wide range of source-separated dry recyclables from the IC&I sector was provided by many private sector haulers and recyclers, who owned and operated facilities.

Collection and processing of wet wastes generated by the IC&I sector was done by the private sector (e.g. centralized windrow composting - Scotts Farm, rendering of food wastes, collection by farmers for landspreading and animal feed, etc.).

Various facilities provided exchange services (e.g. Ontario Waste Exchange, local waste exchange program in Durham, the Re-Uze Centre, Scarborough, WASTEWISE, Halton, etc.)

Voluntary waste reduction initiatives were pursued by individual IC&I establishments. These included undertaking waste audits and developing waste reduction action plans, implementing source separation and recycling programs, and undertaking some source reduction and reuse initiatives.

Packaging reduction initiatives were also carried out on a voluntary basis. The National Packaging Protocol (NAPP), a federal initiative, prescribes a voluntary goal of 50% diversion of packaging from disposal by the year 2000, measured against a 1988 baseline.

5.4.2 Existing IC&I System Description

Management of IC&I waste in the GTA is carried out mostly by private sector haulers, recyclers, brokers and processors, and material is sold to end markets both within and outside the GTA. An overview of the industries which provide IC&I waste management services is presented below.

5.4.2.1 General Overview of Private Sector Haulers and Recyclers

A large majority of the waste haulers in the GTA are able to provide some sort of recycling collection service for their customers.

Waste Haulers

The waste hauling industry in the GTA can be divided into three categories by company size, level and location of service. The range of materials collected by recycling companies that service the GTA IC&I sector primarily include: OCC, mixed office paper, metal food and beverage cans, glass bottles, plastics (rigid and flexible), and wood waste.

Large Companies

The largest group of haulers operating in the GTA represent three of the largest multi-national waste hauling companies in North America. Waste Management Inc. (WMI), Browning-Ferris Industries (BFI) and Laidlaw Waste Systems are the most

dominant haulers in the GTA. Each of these companies provides a wide-range of waste collection services to the IC&I sector. These services include:

- containerized service - provision of 15, 23 and 30 cubic metre containers and compactors (if requested) to customers. Containers are collected by a dedicated truck which services one container at a time;

- front-end loader service - provision of containers from 1.5 to 7.6 cubic metre capacity and compactors (if requested) which are serviced with a front-end loader truck. The truck can collect from up to 30 accounts before becoming filled;

- rear-packer service - provision of collection service to customers using a rear-packer truck. The truck collects from customers that do not have the space, accessibility or volume of waste to effectively use a container. Waste is manually loaded into the truck.

Both Laidlaw and BFI provide recycling programs promoting source separation. Recycling containers (e.g. roll-out carts) are provided to customers for in-house collection of recyclables. These containers are then collected by the hauler on a regular or call basis. The hauler collects the recyclables with a separate truck and usually charges the customer a monthly or per pick-up fee.

WMI operates a different type of program that does not require extensive source separation. The customer is asked to separate waste into dry (e.g. paper, OCC, glass, cans, plastics etc.) and wet (e.g. food and bathroom) waste. WMI collects the materials separately using conventional garbage collection equipment. The wet fraction is sent for disposal and the dry fraction is sent to the Recycle Canada (WMI's recycling company) facility in Etobicoke where the recyclables are mechanically and manually recovered for recycling.

These companies tend not to service the construction, renovation and demolition industry. Materials are usually taken for processing in a private MRF, except in the case of high volume materials such as wood and OCC. These high volume materials are generally collected in containers provided by the hauler and taken directly to a processor or end market.

Middle Level Companies

The second level of waste haulers can best be described as Regional haulers that provide a similar level of service, but individually do not have the same customer base. Also included are large recycling companies that specialize in one type of material. The haulers tend to provide a multi-material service, similar to Laidlaw or BFI, whereas the large recycling companies tend to handle a more limited number of materials that are associated with their business interests.

This second level of haulers number between ten and twenty companies and have the capability (i.e. equipment) to provide a range of collection services to clients such as containerized, front-end loader and rear-packer services. Examples of these types of companies include: Philips Environmental, Miller Waste Systems, L.W. Sanderson, York Disposal, Wasteco, Pak-Man/Tower Disposal, Select Disposal Services, Canadian Disposal Services and U-Pak Disposal. Examples of the large recycling companies in this category include Domtar, Atlantic Packaging, Alcan Recycling, and large scrap metal companies such as Triple M Metals.

These companies tend to work on a more Regional basis, but usually have clients in a number of GTA municipalities. For example, Miller is heavily involved in York and Durham Regions. while Sanderson is more focused in Peel and Halton Regions.

Third Level Companies

Third level companies are characterized by being smaller and independent, with a more limited level of service and customer base. They provide a range of services that may handle a wide range of recyclables but exclude regular garbage. These companies tend only to provide containerized services to heavy industrial, large commercial (require container and/or compactor) accounts, and are very active in the construction, renovation and demolition industry.

Some examples of these types of companies include Cougar Disposal, Romano Disposal, J&F Disposal, Cardinal Waste, Via Disposal, R&R Haulage, Metro Waste Paper, Turtle Island, Enviro-Glass, The Paper Option, HGC Management, AAA Recycling and Office Waste Management.

5.4.2.2 Profile of GTA Recycling Companies

There are over 220 private sector companies providing a range of hauling, processing and marketing services for IC&I wastes in GTA. A complete listing of all IC&I recycling companies in GTA is available through the RCO. A profile of the number of companies covering the range of IC&I waste materials is provided in Table 5.18 (Reference: RCO, "Secondary Material Markets Directory," 1992):

TABLE 5.18
GTA RECYCLING COMPANIES

Material	Number of GTA Companies that Haul, Market the Material
Asphalt and Concrete	21
Construction and Demolition	19
Drum Reconditioning	10
Drywall	24
Food and Beverage Cans	31
Food and Organic Waste	20
Glass	22
Scrap Metal Recovery	57
Paper Products	89
Plastics	68
Social Service Organizations	9
Textiles	9
Tires	18
Wood	63

Source: Recycling Council of Ontario "Secondary Material Markets Directory" 1992.
*Note: The number of services shown adds to greater than the total of 220 because several companies provide multiple services.

A telephone survey was carried out to obtain data from 60 of these companies. To date, 33 companies have been contacted, and 16 of these have provided data on the tonnages of materials and the number of IC&I accounts handled in 1992. These 16 companies employ 540 people, and diverted an estimated 300,000 tonnes of waste in GTA in 1992.

5.4.2.3 Description of a Selection of IC&I Processing Facilities in GTA

A description of all of the processing facilities in GTA is not included in this report. A number of facilities are described however, to illustrate the size and range of facilities in existence. These are organized by the materials handled.

Food Wastes

Barrets Pig Farm is located in Brooklin. This farm has capacity to receive up to 4,000 tonnes food and organic waste annually.

Hy Hope Farms is a hog farming operation which uses food waste from restaurant, hotels and cafeterias as a food source. The facility's stated capacity is 1,200 tonnes.

Construction and Demolition Wastes

Elirpa Construction Materials operates a concrete crushing operation in Pickering. The facility has an estimated capacity of 100,000 tonnes of concrete waste annually.

Hamden & King Construction is a construction waste facility that has capacity to receive up to 14,000 tonnes of asphalt and concrete per year. It is located in Brooklin.

Bennet Paving in Oshawa is a manufacturer of asphalt paving which had a stated capacity of 35,000 tonnes of concrete waste to be mixed with 25,000 tonnes of reclaimed asphalt in 1992.

Drywall Scrap Co. is a depot accepting scrap drywall, located in Oshawa. It has capacity to receive up to 2,400 tonnes annually.

Queensway Recycling is a new facility located in Etobicoke. A joint venture between Cardinal Waste and Teperman Demolition, the facility receives C&D and IC&I wastes and recovers mixed office paper, OCC, wood and drywall.

Harkow Aggregates and Recycling is located in the Toronto Harbourfront area. Harkow operates a C&D processing and transfer operation with an operating capacity of 150,000 tonnes per year. The company manually separates wood, metals and OCC to achieve a reported 7% to 15% diversion of materials accepted. The tipping fee charged for mixed C&D waste is $97 per tonne.

Conwaste operates a C&D and IC&I waste processing and transfer operation in Mississauga. Through manual separation, wood waste and OCC are recovered and sent to markets. The facility handles approximately 50,000 tonnes of materials per year.

Teperman operates a processing facility for their own demolition wastes. Brick and concrete, wood and metals are separated manually and with front-end loaders.

Canadian Eagle Recyclers is located in Markham. Canadian Eagle is affiliated with Greenspoon Demolition and operates a mixed C&D processing and transfer operation. Manual separation is utilized to recover wood, drywall, metals, OCC and used carpet materials. Canadian Eagle further processes wood waste on-site. The operation has an operating capacity of approximately 75,000 tonnes per year.

Several paving manufacturing operations utilize reclaimed asphalt and concrete wastes in the production of new asphalt paving. Two examples of these include Fermar Asphalt in Etobicoke and Warren Bitulithic in Downsview.

Traditional IC&I Recyclables (Cans, Bottles, OCC, Office Papers, etc.)

Courtesy Transfer operates a transfer operation for IC&I wastes where selected materials such as OCC, wood, plastics and other papers are removed prior to transfer. The Mississauga facility has an estimated capacity of 130,000 tonnes per year.

Harrison Disposal operates a waste transfer and sorting operation in Brampton which has an capacity of 15,000 tonnes per year. The facility handles mixed IC&I recyclables. Most of the material handled by the facility is likely to have been generated in Peel Region.

L.W. Sanderson operates a waste transfer and sorting operation in Brampton which has an estimated annual capacity of 100,000 tonnes of dry IC&I recyclables and residential Blue Box materials.

WMI operates a mixed waste sorting and transfer operation in Etobicoke. This facility began operation in 1991 to process select, source separated IC&I recyclables (OCC, wood, mixed papers, metals, glass and plastics) primarily from WMI customers (although the facility is open to other haulers who are able to provide the same quality of material). The facility has the ability to process 400 tonnes/day of mixed waste and is limited to a daily residue quantity of 200 tonnes. Current diversion of incoming waste is estimated at 50-55%.

Laidlaw operates a large MRF in Mississauga which processes all the material collected from the municipal curbside and apartment recycling programs in Mississauga and Brampton. In addition, materials from the approximately 2,000 IC&I locations that are recycling in the GTA are processed at the MRF. The materials handled include mixed paper, OCC, metal cans, glass and polystyrene. The facility currently handles approximately 28,000 t/a of municipal material and 12,000 t/a of IC&I material. Laidlaw are constructing a new MRF and transfer station on the same site with a capacity of 200 t/d.

Miller Waste Systems operates a large operation in Markham which includes an IC&I processing facility, and the ability to handle wood waste, drywall, concrete and asphalt waste. Miller lists materials accepted in Metro's market directory as OCC, ONP, mixed office paper, metal cans, glass and most plastics.

BFI operates a MRF in Concord for IC&I customers. BFI lists OCC, mixed office paper, beverage cans, glass and wood in the Metro Toronto Markets Directory under materials handled.

Prowaste, in cooperation with BFI, operate an IC&I MRF in Mississauga. The facility has an estimated capacity of 50,000 tonnes, and handles OCC, office paper and wood wastes.

The Recycler Inc. operates a sorting and processing operation for IC&I recyclables such as mixed office paper, metal cans and glass. The facility is located in Concord.

Waste Papers

Domtar operates a paper fibre sorting and processing operation in Etobicoke. The facility receives primarily OCC and office papers from haulers and paper generators. The papers are sorted by grade and baled for shipping to Domtar facilities and other markets. The facility capacity is estimated to be 75,000 tonnes of paper fibres. Domtar also operates a liner board manufacturing facility in Brampton which utilizes OCC in the manufacture of new cardboard containers.

Metro Waste Paper operates a sorting and processing operation in Scarborough which handles all grades of paper, metal cans, glass bottles and pallets.

Turtle Island services the IC&I sector and collects mixed office paper, metal cans and glass. It operates a small sorting and processing operation in Etobicoke.

Specialized Wastes

Thermal Waste Reduction (TWR) operates a facility in Scarborough which operates a thermal screw press. The machinery has been used for a number of applications including the processing of wood waste and tires.

National Rubber Co. has been using recycled tires in the manufacture of various rubber products since 1927. In 1992, the company consumed approximately 22,500 tonnes of tires. National Rubber is expanding their operations to handle a total of 45,000 tonnes of tires from Ontario by 1997.

Alcan Recycling operates a processing operation in Brampton which handles primarily aluminum cans collected through the Brewers' Retail and municipal curbside collection programs. Alcan also handles and processes glass and cans collected from IC&I customers.

Wood Conversions Inc. (WCI) is a wood processing operation located in Brampton. The facility receives mixed and clean loads of wood waste and processes the wood through a series of chippers and screens to produce a consistent sized wood chip. The facility has an estimated capacity of 23,000 tonnes of wood waste per year. Most of the material handled by the facility is likely to have been generated in Peel Region.

The Canadian Polystyrene Recycling Association (CPRA) operates a sorting and processing facility in Mississauga. The facility receives polystyrene from large generators (e.g. automotive manufacturers), haulers and municipalities for processing and eventual sale to plastic manufacturers. The estimated annual capacity is 25,000 tonnes per year. In 1992, the facility processed 864 tonnes from the IC&I sector, including 186 tonnes of foam and rigid plastics from food service establishments. (Reference: "PS Recycling News", Resource Recycling's Recycled Plastics Update, June 1992).

Knowaste Technologies has recently established a facility in Mississauga that processes used diapers and sanitary napkins from hospitals and nursing homes.

IKO Industries in Brampton use wood waste and OCC in the manufacture of roof felt and shingles. The facility has expanded capacity to handle 30,000 tonnes of wood waste in 1993.

Westroc is a drywall manufacturer which purchases recycled gypsum from New West Gypsum in Oakville. The recycled gypsum is used in the manufacture of new drywall sheeting.

5.4.2.4 Waste Exchange, Reuse, Promotion and Education Activities

Waste Exchange

Various facilities provided exchange services (e.g. Ontario Waste Exchange, local waste exchange program in Durham, the Re-Uze Centre, Scarborough, WASTEWISE, Halton, etc.)

The Ontario Waste Exchange (OWE) assists waste generators to identify markets for their waste materials. In 1992, OWE handled 56,356 tonnes of materials. The proportion of these generated by GTA companies is not known. Since start-up in 1987, OWE has handled a total of 222,415 tonnes of waste materials in the Province. The quantities of waste exchanged on an internal basis are not known.

Promotion and Education

Promotion and education activities carried out by Metro Toronto and Peel, and focused on the IC&I sector are summarized below.

Metro Toronto

- over 300 waste audits were conducted in 1990;
- produced a guide to develop a commercial and industrial waste reduction and recycling plan;
- produced a market directory of facilities recycling banned materials;
- produced an office paper recycling guide;
- produced an educational kit for schools; and
- established an IC&I information hotline which handled 6,000 inquiries in 1991. Discussions with Metro have revealed that the telephone hotline is now receiving 400 calls per month.

The City of Toronto Public Works Department indicated that:

- in the Fall of 1991, material recovery services were begun in 2,500 restaurants and 6,000 retail stores;

- paper recovered from City operations in 1991 increased by almost 50% over 1990, largely due to extension of the program to all city offices;

- developers submitted 83 waste reduction and material recovery plans in 1991, bringing to 168 the number of new plans approved for new developments since 1988. When these properties are in full operation, they will have average diversion rates of 40%, and will divert about 22,000 tonnes per year from landfill.

Peel

- approximately 10,000 posters were distributed to the IC&I sector to encourage businesses to become environmentally-conscious;

- 147 waste audits were performed by Regional staff by 1991, in addition to visits advising companies in the 3Rs;

- the Region supports a general recycling telephone hotline that also accepts IC&I questions;

- the Region holds an annual day-long seminar including presentations and awards for outstanding achievements in waste reduction;

- the Region publishes a directory of recycling markets;

- the Region liaises with industry associations to promote 3Rs programs;

- the Region provides research and development assistance for companies with new waste reduction initiatives; and

- the Region provides education programs to schools with assistance of a Joint Committee for the Environment of the Separate and Public Boards of Education in Peel.

5.4.2.5 Current IC&I Waste Diversion Activities in GTA

Information on waste diversion activities by IC&I waste generators in GTA has been gathered from published articles, previously published studies and documented success stories. The study team also conducted a telephone survey of associations representing industrial and commercial groups as well as individual waste generators in each GTA Region in February and March, 1993.

The results of this survey (summarized in the Service Technical Appendix) indicated that 3Rs activity varies widely among all sectors so that general statements on recycling rates are difficult. Clearly though, awareness of potential opportunities for waste reduction and recycling is growing in the IC&I sector. Significant results have been achieved in specific IC&I establishments in virtually every sector.

For example, some large manufacturing facilities in GTA reported over 80% reductions in waste disposed. Surveys and discussions with private haulers and recyclers indicated substantial participation of office establishments in reported recycling programs. Elaborate 3Rs programs have been established in hospitals, resulting in diversion rates of around 30% in participating facilities. Retail shopping complexes have also established recycling programs where one reported a recycling rate of 16% in 1992. It was generally agreed that there is potential to divert significant quantities of food wastes from landfill if wider-scale composting is established.

Industry associations have served as information sources on environmental and recycling measures for their memberships. Some have conducted surveys of initiatives within their membership, but they do not generally have a comprehensive picture of recycling activity within the whole sector.

The Ontario Waste Management Association (OWMA) conducted a survey of its membership in March, 1991 which estimated that the IC&I diversion rate for the GTA was 17.8% and was expected to reach 23.7% in September, 1991. A survey was conducted in mid to late 1993 to determine recycling levels for 1992 and will be the best source of available data from the Association.

5.4.2.6 Components of IC&I 3Rs System

The components of the existing GTA IC&I 3Rs system are described below:

IC&I Collection - Dry Wastes

- Voluntary source separation of dry recyclables by some IC&I generators.
- Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers.
- Curbside collection of IC&I recyclables in some areas (City of Toronto, Caledon) by municipal forces.
- IC&I depots at transfer stations for use by small business generators.
- Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.).

IC&I Collection - Wet Wastes

- Voluntary source separation of IC&I wet wastes.
- Separate collection of IC&I wet wastes.

IC&I Processing - Dry Wastes

- Processing of specific dry materials (e.g. C&D wastes, wood, drywall etc.) in specially designed facilities.
- Processing centres for a wide range of dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff (Laidlaw MRF, Mississauga, WMI MRF, Etobicoke, or BFI MRF, Concord).
- Processing of IC&I sector recyclables in municipal MRF's.
- Processing of IC&I sector recyclables by small private sector recyclers.

IC&I Processing - Wet Wastes

- Centralized windrow composting of source-separated IC&I organics (Scotts Farm).
- On-site composting of source separated organics generated by the IC&I sector.
- Centralized composting of IC&I organics in in-vessel system.
- Vermi-composting at some IC&I locations.
- Rendering of food wastes from IC&I sector.

IC&I Reuse

- Reuse by IC&I generators, through the Canadian, Provincial (e.g. Ontario Waste Exchange) and local waste exchange programs (e.g. Durham Region).
- Community-based reuse programs for small IC&I generators (WASTEWISE, Halton).
- Use of food wastes as animal feed.
- Use of food waste for human consumption.
- Landspreading of IC&I organics.
- Refilling of IC&I containers and packaging (e.g. refillable bottles, refillable pails or drums, etc).
- Use of re-usable packaging (e.g. reusable plastic and wood pallets).

IC&I Reduction

- Voluntary waste reduction actions by IC&I generators.
- Voluntary reduction of packaging waste by 50% by the year 2000 (NAPP).

IC&I Programs

- Voluntary waste audits performed by IC&I generators.
- Independent voluntary waste reduction programs in private companies.
- Voluntary packaging reporting by packaging users (NAPP).

IC&I Promotion & Education

- IC&I information hotline (Metro Toronto).
- Promotion/education program focused on reducing waste disposed by the IC&I sector, carried out by the Regional municipality.
- Promotion/education of IC&I waste reduction by non-profit organizations (e.g. RCO).
- Promotion/education of IC&I waste reduction by associations.

5.4.3 Diversion Achieved by Existing IC&I System

It is estimated (through a material by material methodology presented in the Service Technical Appendix) that approximately 25 to 32% of the IC&I waste generated in 1992 was diverted. Based on the assumption that approximately 2.9 million tonnes of IC&I waste were generated, an estimated 720,000 to 900,000 tonnes were diverted. The estimated composition and the diverted and disposed waste stream in each case is presented in the Service Technical Appendix.

5.4.4 Existing IC&I System Costs

Costs for the existing GTA IC&I system were developed using "ballpark" costs and unit prices for recycling and disposing of different materials obtained through discussions with GTA haulers and recyclers. General IC&I waste collection and disposal rates were obtained through discussions with haulers. These costs are considered less reliable than the cost data used for the residential systems, which were obtained from municipal budget data.

Private sector costs are likely to change as economic factors change. As an example, the tipping fee for IC&I waste disposal in the GTA dropped from $150/tonne, to $80-$90/tonne during the course of this study. This had a significant impact on estimated costs. The prices quoted to the study team may have been based on competing with a disposal rate of $150/tonne, and may change as a result of the tipping fee rate change. For this reason, these costs should be considered of value only for comparative purposes.

The total GTA IC&I waste management system cost is estimated to have been approximately $360 million in 1992. A rate of $50/tonne was assumed for collection of most IC&I materials in the GTA to develop these costs. The IC&I diversion system is estimated to have cost $112 per tonne of material diverted in 1992. The assumptions on which these estimates are based are presented in the Cost Technical Appendix.

5.5 Existing/Committed GTA IC&I 3Rs System

5.5.1 Existing/Committed IC&I System Overview

The Existing/Committed GTA IC&I system includes all of the elements of the Existing system described in Section 5.4, and also the policy commitments announced at the local, Regional, Provincial and Federal level by the end of 1992. The most substantial of these is the Ontario 3Rs regulations, the draft text of which was released in April, 1993. It is anticipated that the Ontario 3Rs regulations will be promulgated under the *Environmental Protection Act* in the near future. GTA IC&I facilities affected probably have 6 to 12 months from that date in which to comply.

The existing 3Rs infrastructure can probably handle the quantities of IC&I waste diverted by this system, hence substantial new facilities are not expected to be required as the Existing system has excess capacity (per discussions with industry representative) and the incremental impacts of the Regulations on waste diversion are not expected to be significant (see Service Technical Appendix).

5.5.2 Description of Proposed 3Rs Regulations

There are three requirements under Ontario's proposed 3R's regulations. Major generators must:

- implement source separation programs;
- carry out waste audits and develop and implement waste reduction action plans; and
- some manufacturing facilities must carry out packaging audits and develop packaging reduction action plans.

Designated Major Waste Generators

The regulations will apply only to those IC&I establishments which are designated as major waste generators. These are:

- retail shopping establishments with a floor area of at least 10,000 sq. m;
- retail shopping complexes with a floor area of at least 10,000 sq. m.;
- construction projects with a total floor area of at least 2,000 sq. m;
- demolition projects with a total floor area of at least 2,000 sq. m;
- office buildings with a total floor area of at least 10,000 sq. m;
- multi-unit residential buildings containing six or more units;
- restaurants with ten or more employees;
- hotels and motels which have 75 units or more;
- hospitals classified as A, B, or F in Regulation 964;
- educational facilities with enrolment of 350 persons or greater; and

- manufacturing facilities with 100 employees or more.

Source Separation Requirements

The regulations require that designated major generators implement a source separation program covering a number of materials. Collection, handling and storage facilities must be provided for the materials specified. The generator must make reasonable efforts to ensure that source separated materials are reused or recycled. The list of materials that is required to be separated varies among different sectors, and is as follows:

Retail, office buildings, hospitals, educational

- aluminum food and beverage cans;
- OCC;
- fine paper;
- glass bottles and jars for food and beverages;
- ONP; and
- steel food and beverage cans.

Restaurants, hotels and motels

- aluminum food and beverage cans;
- OCC;
- fine paper;
- glass bottles and jars for food and beverages;
- ONP;
- steel food and beverage cans; and
- PET.

Multi-unit residential

- aluminum food and beverage cans;
- glass bottles and jars for food and beverages;
- ONP
- steel food and beverage cans;
- PET; and
- other materials collected by local Blue Box program.

Large manufacturing

- aluminum;
- OCC;
- fine paper;
- glass;
- ONP;
- steel;
- PET;
- HDPE (jugs, crates, pails, totes and drums);
- low-density polyethylene (LDPE) film;
- polystyrene foam;
- polystyrene trays, reels and spools; and
- wood.

Construction

- brick;
- OCC;
- concrete;
- drywall;
- steel; and
- wood.

Demolition

- brick;
- concrete;
- steel; and
- wood.

Waste Audits and Waste Reduction Work Plans

The designated major generators must also carry out waste audits and develop waste reduction action plans. These must be updated on a yearly basis. Work plans must be communicated to employees.

Packaging Audits and Packaging Reduction Work Plans

Under the regulations, large manufacturers of food, beverages, paper and chemical products (in SIC 10, 11, 27, and 37), with greater than 100 employees and importers of these categories of products with annual sales volumes greater than $20 million per year must carry out packaging audits and develop packaging reduction work plans. These audits must be carried out at least every two years. They must be summarized and communicated to employees. They must be maintained on the premises and submitted to the MOEE upon request.

5.5.3 Components of the Existing/Committed GTA IC&I System

The components of the Existing/Committed GTA IC&I system are as follows:

IC&I Collection - Dry Wastes

- Voluntary source separation of dry recyclables by some IC&I generators.
- Mandatory source separation of designated materials by major generators (3Rs regulations).
- Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers.
- Curbside collection of IC&I recyclables in some areas (City of Toronto, Caledon) by municipalities.
- IC&I depots at transfer stations for use by small business generators (Metro Toronto).
- Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.).

IC&I Collection - Wet Wastes

- Voluntary source separation of IC&I generated organics.
- Separate collection of IC&I wet wastes

IC&I Processing - Dry Wastes

- Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities.

- Processing centres for a wide range of dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff (e.g. Laidlaw MRF, Mississauga or BFI MRF, Concord).

- Processing of IC&I sector recyclables in municipal MRF's.

- Processing of IC&I sector recyclables by small private sector recyclers.

IC&I Processing - Wet Wastes

- Centralized windrow composting of source-separated IC&I organics (Scotts Farm).

- On-site composting of source separated organics generated by the IC&I sector.

- Centralized composting of IC&I organics in in-vessel system.

- Vermi-composting at some IC&I locations.

- Rendering of food wastes from IC&I sector.

IC&I Reuse

- Reuse by IC&I generators, through the Canadian, Provincial (e.g. Ontario Waste Exchange) and local waste exchange programs (e.g. Durham Region).

- Community-based reuse programs for small IC&I generators (WASTEWISE, Halton).

- Use of food wastes as animal feed.

- Use of food waste for human consumption.
- Landspreading of IC&I organics.
- Use of refillable containers (refillable bottles, refillable pails or drums, etc.).
- Use of re-usable packaging (e.g. reusable plastic and wood pallets).

IC&I Reduction

- Voluntary waste reduction actions by IC&I generators.
- Voluntary reduction of packaging waste to contribute to NAPP target of 35% reduction of packaging waste by 1996, and 50% diversion (through Reduction, Reuse and Recycling by the year 2000 (NAPP), measured against a 1988 baseline.
- Mandatory development of waste reduction action plans by major IC&I generators (defined in 3Rs regulations).
- Mandatory development of packaging reduction action plans by major packaging generators (defined in 3Rs regulations).

IC&I Programs

- Voluntary waste audits performed by IC&I generators.
- Independent voluntary waste reduction programs in private companies.
- Mandatory waste audits by major IC&I generators (3Rs regulations).
- Mandatory packaging audits by major packaging generators (3Rs regulations).
- Voluntary packaging reporting by packaging users (NAPP).

IC&I Promotion & Education

- IC&I information hotline (Metro Toronto).
- Promotion/education program focused on reducing waste disposed by the IC&I sector, carried out by the Regional municipality.
- Promotion/education of IC&I waste reduction by non-profit organizations (e.g. RCO).
- Promotion/education of IC&I waste reduction by associations.
- Mandatory posting of waste reduction plans for review by employees of major IC&I generators (3Rs regulations).

5.5.4 Diversion Achieved

It is estimated that under the 3Rs regulations and NAPP, together with other continuing voluntary diversion efforts by IC&I establishments, between 34 and 46% of total IC&I waste generated could be diverted. The lower end of this range is considered more likely. This estimate has been developed using 1992 IC&I waste generation and composition estimates and would be achieved by 1995 when the impacts of the 3Rs have come into full effect.

5.5.5 Cost

Costs for all systems were developed using estimated costs and prices for recycling and disposing of different materials obtained through discussion with GTA recyclers, and general IC&I waste collection and disposal rates obtained through discussions with haulers. These are considered less reliable than the cost data used for the residential systems, which were obtained from municipal budget data, and are likely to change as economic factors change. These costs should be considered of value only for comparative purposes.

Estimated costs of the existing IC&I system were developed using unit costs obtained from a number of sources applied to the estimated quantities of materials managed by a number of different methods. The approach to cost estimation is described in detail in the Cost Technical Appendix. Based on the methodology used, the cost of the GTA

Existing/Committed IC&I diversion system is estimated to be in the range $114-$116 per tonne diverted.

The total IC&I waste management system cost (diversion and disposal) is estimated to be in the range of $361-$367 million per year based on management of approximately 2.9 million tonnes of IC&I waste per year. The assumptions on which the cost estimate is based are presented in the Cost Technical Appendix.

5.6 Markets for Secondary Materials

5.6.1 General

The development of viable markets for secondary materials is the key to developing and sustaining successful waste diversion programs that incorporate Reuse and Recycling.

Current and future markets for materials which may be recovered through GTA waste diversion programs are discussed in some detail in the Service Technical Appendix. The findings presented in the Service Technical Appendix are summarized below.

5.6.2 Markets for Fibres

Because of the different issues involved, markets for secondary fibres are summarized below under a number of separate headings.

ONP (Old Newsprint)

The market for ONP is expected to remain stable in the foreseeable future. Four new de-inking mills which were constructed in Ontario in 1992 have increased Ontario's de-inking capacity to 468,000 tonnes per year. Ontario Blue Box programs currently collect an estimated 240,000 tonnes per year. Prices paid for ONP are currently approximately $32/tonne. If demand outstrips supply, ONP prices may rise as high as $60/tonne.

OCC (Old Corrugated Cardboard)

OCC is one of the easiest materials to recycle, as it is generated in large quantities by many large IC&I generators. OCC has an established market in Ontario which is capable of absorbing more domestic OCC than is currently collected. In addition, planned expansions by Domtar in Cornwall, Ontario, and Windsor, Quebec, and MacMillan Bloedel in Sturgeon Falls may increase the demand for OCC by an estimated 464,000 tonnes per year. The price paid for OCC depends on the price of substitute fibres such as ONP. As markets for these materials firm up, the price for OCC should stabilize at $25 to $35/tonne.

Boxboard

Markets for post-consumer boxboard have traditionally been weak, due in part to high levels of contamination by glues, plastics and liners. Limitations on the use of post-consumer boxboard for food packaging also limits the potential markets for this material.

Only two of the three Ontario mills (Cascades Paperboard International in Toronto and Strathcona in Napanee) currently accept clean, baled post-consumer boxboard. Current prices paid for post-consumer boxboard are $20/tonne to stimulate recovery programs in the short term. A number of developments may stimulate the market for post-consumer boxboard in the future (see Service Technical Appendix). If these proposals do not proceed, currently available markets could not absorb the supply if Expanded Blue Box programs were to be implemented in GTA.

OMG (Old Magazines)

OMG is an important feedstock to the de-inking process, and is required in the manufacture of recycled newsprint. It offers strong fibres and clay content, which add stiffness, opacity and bulk to the newsprint. De-inking mills generally run at a 30% OMG, 70% ONP ratio, although one US mill can manufacture newsprint from a feedstock which is 100% OMG. Demand for OMG by Ontario mills increased from 37,000 tonnes in 1991 to 247,700 tonnes in 1992, and is expected to increase to 348,700 tonnes in 1993. Demand therefore considerably exceeds available supply. Prices currently paid for OMG are $25/tonne. Some mills now accept OMG comingled with ONP at the price paid for ONP ($32/tonne).

Fine Paper

Fine paper is now collected through many office recycling programs. The demand for recycled content in fine papers has resulted in the development of a number of de-inking facilities to accept post-consumer fine paper as feedstock. Prices for fine paper depend on the grade, and average $100 to $120/tonne. In 1992, prices for CPO (computer print-out) averaged $190 to $220/tonne, with the price of white and coloured ledger at $120 to $140/tonne. The demand for post-consumer fine paper is expected to remain stable for the foreseeable future.

Mixed Paper

Mixed paper has traditionally been used by mills in processes which have a higher tolerance for contamination and can accept a heterogeneous feedstock. The use of mixed paper depends on price, availability, and the prices of other fibres such as ONP and OCC. As prices rise, mills which produce containerboard, boxboard, and roofing products can effectively substitute mixed paper for ONP and OCC. Mixed paper is traditionally used by mills which manufacture napkins, toilet paper, tissue paper, and is also used in the manufacture of boxboard (up to 40% mixed paper feedstock). Prices for mixed paper vary from $0 to $30/tonne, and can be expected to remain low as long as inexpensive OCC and ONP are available. Demand for mixed paper is expected to continue to exist for the foreseeable future.

Polycoat Packaging

Polycoat packaging is used in milk containers and drink boxes. Most mills with a hydrapulper can accept polycoat. After hydrapulping the quality of the pulp is similar to computer printouts, only the fibres are longer and stronger. Prices paid for polycoat vary from $90 U.S. to $150 U.S./tonne. These prices are artificially high at present to stimulate collection. For the foreseeable future, markets for polycoat would be located in the Northeastern US, as no Ontario mill has a hydrapulper. As supply increases, the prices paid for polycoat would be expected to drop, however, markets are likely to be available for the foreseeable future.

5.6.3 Markets for Plastics

The prime goal of plastics recycling is to provide a secondary feedstock material that is virtually identical to virgin feedstock. This requires not only separation by resin type, but also by feedstock, removal of other contaminants such as metal pieces, labels, adhesives, etc., and cleaning to produce a clean feedstock. Plastics have a very low tolerance for contamination by other resin types and colours. Because of this limitation, successful plastics recycling continues to present a number of challenges. Sorting post-consumer plastics into the appropriate colours and resins is labour intensive and prone to error. Efforts continue to develop effective mechanical sorting methods for plastics recycling, however, successful economical solutions have not been found to date. PET and HDPE have the strongest markets, at current prices of $165/tonne and $50 to $130/tonne respectively. The market price for PET is artificially inflated at this time, to meet the requirements of Regulations 622/85 and 623/85. CPRA provides a polystyrene recycling facility in the GTA. A price is generally not paid for the unprocessed polystyrene. Other plastics will continue to suffer from lack of markets in the short to medium term. Most plastic resins and mixed plastics continue to pose recycling problems. This situation is expected to continue until strong market development initiatives are undertaken for these materials.

5.6.4 Markets for Organics

In comparison to traditional recyclables, markets and processing methods for organics are just emerging. Organic materials can be grouped into a number of headings, including: usable food fit for human consumption, other putrescibles; non-putrescibles and compost. For ease of presentation, organics are grouped into three categories for this discussion. These groupings are: food waste, yard waste and compost.

Food waste should be used as human food wherever possible. Agencies such as Second Harvest and other food banks can broker food waste of suitable quality, and redistribute this to social service agencies for distribution to the needy. This is a suitable option for some cooked food waste from the IC&I sector. A number of IC&I establishments have made arrangements with area farmers for disposal of food waste as animal feed. If the food is fed to swine, strict cooking requirements must be followed. There is only a small number of registered swine farmers in Ontario who are licensed to accept food waste for swine feed. For other animals (cattle, chickens, etc) requirements are less strict. Rendering of food waste is a viable but relatively expensive option. Rendering companies traditionally have focused on processing meat products to produce oils and tallow needed for a number of industrial processes. With the decline of red meat consumption, some

rendering companies have excess capacity which they can use to process food wastes into animal meal. Landspreading is an option for some food processing wastes. Where the above options can not be used, food waste can be composted either on or off-site, and the finished compost can be used for a number of purposes.

Biofuel production (methanol, methane, etc.) from organics, particularly custom-grown crops is a future potential end use for organics, but is not considered of any direct appreciation to movement of most organic waste associated in GTA at this time.
Composting is an option for processing of both food and yard wastes. Available and/or planned composting capacity in the GTA is estimated to be adequate to process the quantities of organics which could be source separated by both the residential and IC&I sectors in the future. However, options for use of finished compost depend on its quality. Ontario has stringent compost quality guidelines and these will limit the potential end uses of finished compost in many cases. Because of the uncertainties regarding the quality of the finished compost from future composting operations, and also the relatively undeveloped nature of compost markets at this time, there were considerable difficulties in quantifying the potential end uses of finished compost generated by future increased composting activity in GTA for this study. End uses for high quality compost include sale at garden maintenance centres, land reclamation, landscaping (for parks and golf courses, etc). Lower quality compost can be used for rehabilitation of land not intended for residential development, and as landfill cover material.

5.6.5 Markets for Construction and Demolition Waste

There are a number of processing facilities in the GTA, or near the GTA that will accept mixed or source separated loads of C&D waste for processing and diversion to beneficial end uses. Based on available data, capacity appears to be available to process C&D wastes generated in GTA. In addition, private sector companies have expressed an interest in building additional capacity if the economics become more favourable. The economics of operating these facilities depend on the comparative cost of waste disposal. Because of the low cost of waste disposal south of the border in the last year or two, operators of these facilities report that much C&D waste which could be processed and diverted is landfilled due to the lower cost. End uses of processed C&D material include:

- drywall — manufacture of new drywall
  soil amendment
  kitty litter

- bricks and blocks — roadbase/backfill

	decorative facades
• untreated wood	chipped for fuel, landscaping compost bulking animal bedding particle board manufactured building products
• plastic	chipped/shredded and used as insulation
• asphalt shingles	paving materials (technical barriers at present)
• old asphalt road surface and granular base	
• metals and OCC	traditional markets

Processing capacity exists in the GTA for 1,000,000 tonnes per year of old asphalt as confirmed by WRO staff with the Ontario Hot Mix Producers Association. The preferred use of this material is in Reclaimed Asphalt Pavement (RAP). Municipalities have raised some concerns about the durability of this material, and 60% of old asphalt is being stockpiled at present. The other 40% is used in the hot mix as granular base material (Reference: WRO data).

5.6.6 Markets for Metals

Metal recycling is a well established practice, through a well-developed network of metal brokers. It has been assumed for this study that markets will continue to be available for metals recovered from the GTA waste stream, based on discussions with metal brokers. Prices paid will sometimes depend on the spot market price for the metal. The price for aluminum varies considerably, but has been around $700 to $800/tonne for some time. The price for steel is generally in the $70-$90/tonne range. The metal processing requirements will depend on the end markets chosen. As an example, some steel mills have a very low tolerance for tin in the mix, and will therefore not accept white goods.

5.6.7 Markets for Glass

Recycling of container glass is a well-established practice that reprocesses colour separated glass into cullet for the remanufacture of bottles and jars. Glass recycling is

highly dependent on a stringent separation process to reduce contamination and ensure product quality. This high quality material is not always available in post-consumer residential glass. Handling and sorting of glass at MRFs is presently expensive, time consuming and not always successful. To avoid such stringent requirements and to expand markets for glass, considerable effort is being dedicated to developing alternative end uses for glass cullet (such as aggregate substitute, sand substitute for sandblasting, manufacture of glass tiles etc.). Consumers Glass is the dominant market for GTA glass at the present time. Prices paid range from $38/ton for green glass to $43/ton for flint.

5.6.8 Markets for Textiles

Used textiles can be used as clothing, industrial fibre and industrial wiping cloths. Used clothing commands the highest price and industrial fibre currently is worth the least. There is currently a significant undersupply of textiles, particularly to satisfy the growing demand for used clothing. The infrastructure for textile collection is currently in its infancy, however, markets for the material are relatively well-established and stable. Social service and charitable organizations are increasingly involved in providing diversion opportunities, and future linkages with government organizations and agencies are likely. Such alliances would provide a cost-effective mechanism for recovering textiles. Prices are currently in the $180/tonne range.

5.7 Waste Export

5.7.1 Role of Waste Export in this Study

Waste export is considered waste sent to disposal, and is not considered waste diverted from disposal (through 3Rs or other means) in this study. The export of waste from Ontario for disposal in other jurisdictions has therefore not been addressed in this study. The quantities of waste generated in GTA and diverted from disposal through 3Rs have been estimated and addressed in this study without taking available information on waste export into account for a number of reasons presented in earlier sections of this document. Waste that is exported includes materials which could be diverted through reuse, recycling and composting, thus reducing the potential for beneficial use of these materials. This study does not have sufficient information on the composition of wastes exported to determine their diversion potential.

5.7.2 Overview of Waste Export Issue

Quantities of solid waste exported to the United States have increased significantly since mid-1991, due primarily to three factors. Tipping fees at landfill sites within the GTA increased dramatically between 1988 and 1991, and landfill bans were imposed on specific materials. In addition, changes to U.S. Department of Agriculture regulations in July 1991 no longer required incineration of solid non-hazardous domestic waste originating in Canada, thus making landfill disposal of Ontario garbage in the U.S. possible.

Thirdly, new criteria for landfill design and operation were promulgated in the U.S. Resource Conservation and Recovery Act (RCRA) Subtitle D by the U.S. Environmental Protection Agency in 1991. This legislation takes effect in October 1993. These criteria are being met or exceeded by many of the privately-owned landfills in the northeastern U.S., but those that do not meet the criteria are attempting to use all of their remaining capacity quickly.

Some landfill owners lowered their tipping fees in order to attract as much business as possible before the October 1993 deadline lowered their prices to a level where it became cost competitive to ship waste from the GTA to the U.S., particularly when the tipping fees reached $150/tonne. Industry experts had predicted that these landfills would cease operation soon after the October 1993 deadline, thus likely resulting in a price increase at other landfills in the area which comply with the regulatory requirements. However, the industry is of the opinion that the requirements of Subtitle D under RCRA will be met more slowly than originally anticipated, therefore lower prices south of the border will continue to provide an economical method of waste disposal for generators in the GTA.

Gartner Lee Limited and Ernst and Young prepared a preliminary study on waste export in Ontario for the Waste Reduction Office in February 1993. The most common destinations for the exported waste were Pennsylvania, Ohio, Indiana, New York and Michigan. Based on U.S. facility contact data and on truck counts carried out at selected border posts for a one week period, it was estimated that approximately 1.3 million tonnes of waste were exported from Ontario in 1992. Alternative sources of information also were used to verify the study estimate. Officials from a select number of Ontario municipalities were contacted, and their total waste export estimate was 1.397 million tonnes. U.S. State Officials and Disposal Facility Operators estimated that they had received approximately 1.03 million tonnes of waste from Ontario sources. Both estimates tend to confirm the order of magnitude of the study findings. The study concluded that no accurate record of export activity for 1992 was available.

In order to attract private sector waste back to GTA landfills, Metro Toronto lowered its tipping fee to $90/tonne, and Region of Peel lowered their tipping fee to $80/tonne in May 1993.

5.7.3 Export Estimates by GTA Region

Export estimates developed by GTA Regional staff are discussed below. This should be considered anecdotal information only, and has not been used for any estimates developed during this study.

Durham Region does not export municipal (residential) waste to the U.S. It appears likely that IC&I waste from the Region is exported by private hauling firms. No published estimates of waste export from Durham Region have been identified.

Estimates of the quantities of waste exported from Metro Toronto vary. Metro estimates that approximately 1,000,000 tonnes of waste were exported to the U.S. in 1992 (Metro, 1993). Gartner Lee Limited estimated exports from Toronto for 1990 and 1991 to be 532,590 tonnes and 347,507 tonnes respectively, and 900,000 tonnes in 1992. According to an earlier (1992) report from the WRO, waste exported from Metro was estimated as 25,000 tonnes in 1990, approximately 400,000 tonnes in 1991 and about 700,000 tonnes in 1992 (WRO, 1992). Most or all of this waste would be from IC&I sources.

An estimated 53,125 tonnes of IC&I waste were exported to the U.S. from Peel Region in 1991. The estimated amount of waste exported in 1992 was 253,183 tonnes (Peel, 1993). Gartner Lee Limited reported a similar amount (rounded off to 250,000 tonnes) of Regional waste export to the U.S. in 1992 (Gartner Lee Limited, 1993). All of this waste was assumed to be from IC&I sources in Peel, as residential waste was not exported.

IC&I waste from York Region may be exported by private hauling firms. No data were located to estimate this amount, however, the total quantity of waste landfilled in 1991 and 1992 was significantly less than in the preceding years, which is likely due in part to waste export.

The Regional Municipality of Halton's waste is now disposed at the Halton Waste Management site in Milton. This site opened in November, 1992. Prior to this, Halton's waste was taken to the Norjohn transfer station in Burlington for export from the Region. Roughly half of this waste was taken to Buffalo for disposal at Occidental, and the remainder was taken to Walker Brothers in Thorold. Landfill disposal quantities were

supplied to the study team by Halton Regional staff for 1990 through 1992. There are apparently no waste disposal data available prior to 1990.

Gartner Lee Limited estimated that Halton Region exported approximately 12,000 tonnes of municipal (residential) waste in 1992. An estimated 100,000 tonnes of waste was exported by IC&I sources in 1992.

References

(1) Gartner Lee Limited and Ernst & Young, February 1993, Ontario Waste Export Study (Draft Report).

(2) Memo to Metropolitan Works Committee from the Commissioner of Works, February 23, 1993, Waste Diversion Targets.

(3) Waste Reduction Office, 1992, 1992 Status Report-Waste Reduction, Re-use and Recycling in the GTA, Ministry of the Environment and Energy.

(4) Regional Municipality of Peel, May 1993, 1992 Annual Report - Waste Reduction and Recovery Programs (Draft).

5.8 Future Waste Generation and Composition

5.8.1 Role of Future Waste Generation and Composition in this Study

Available information on potential future changes to waste generation and composition by both the Residential and IC&I sector are presented briefly in this section to illustrate the range of opinions which currently exist on this topic. Future waste generation and composition is obviously a critical factor in planning of future waste management facilities and programs. Future waste generation estimates have been presented for both the Residential and IC&I sector in each GTA Region earlier in this section. These estimates have assumed that future waste generation will be similar to the generation (expressed as tonnes/capita and tonnes/employee) experienced in the last six to seven years. It has also been assumed that some source reduction of these generation rates will occur over time.

Future waste composition is more difficult to predict with any degree of confidence, as it depends on a large number of factors. Future residential waste composition will vary

depending on how our lifestyles and attitudes to consumption changes over the next 20-25 years. Future IC&I waste composition will depend on how our commercial and industrial base changes in the next 20-25 years. Because of the uncertainty associated with future waste composition estimates, this study has been carried out assuming that generated waste composition will remain similar to what is currently experienced. This is considered a conservative approach, but is more reliable and defensible than assuming a waste composition trend based on a number of assumptions which may or may not occur.

5.8.2 Approach to Discussion of Future Trends

Predicting future trends for waste generation and composition relies on predicting future economic, technological, social and lifestyle trends. This, for the long term especially, is very subjective and mostly theoretical. Short term trends can be predicted with more accuracy, however, because their beginnings are often rooted in past and present behaviour. For this reason, future trends are discussed in two separate sections of text, namely the short term, which covers the years 1993 to 2000, and long term trends, which cover the years 2000 to 2016.

5.8.3 Short-Term Trends: 1995 to 2000

The 1992 report *Characterization of Municipal Solid Waste in the United States*, prepared by Franklin Associates for the Environmental Protection Agency, indicated that per capita waste generation in the United States increased from 2.7 pounds per person per day in 1960 to 4.3 lbs per person per day in 1990. By the year 2000, it predicts that the waste generation rate will increase to 4.5 lbs per person per day. This indicates that generation of solid waste is still anticipated to increase somewhat in the next seven years, even though this increase will occur at a substantially slower rate than has been experienced in the last 30 years. Achieving this slightly increased per capita generation rate depends on diverse variables such as demographic changes, economic factors and consumer preferences, all of which are somewhat difficult to predict. Overall, the Franklin report projects that municipal solid waste generation will increase at a rate of 1.3 percent annually between 1990 and 2000, compared to an annual increase of 2.8% for the years 1980 to 1990.

The Franklin report projects no major changes in waste composition in the next seven years. Paper and paperboard are projected to be the dominant material in municipal solid waste (MSW) and will make up an estimated 38% of total waste generated. The use of these materials as well as plastics, wood and some miscellaneous materials is expected to

increase faster than the population, while the use of glass and metals are projected to increase more slowly than the population. Food wastes are projected to show no increase in generation, while yard trimmings are expected to decline as a percentage of the waste stream.

Durable goods are projected to increase in tonnage and as a percentage of total generation. The trends for generation of these goods as waste are already established through production numbers, as most appliances, carpets, rugs and furnishings are assumed to have a life of twenty years. Trends which are expected to continue include:

- the substitution of lighter materials such as aluminum and plastics for heavier steel;
- manufacturing of smaller cars; and
- manufacturing of tires with longer life spans.

Generation of containers and packaging is expected to increase in both tonnes and percentage of waste generated and will remain the largest single category of MSW generated in the US by the year 2000. Conditions or initiatives that are unique to Canada and Ontario should be considered when predicting waste generation trends for Ontario and the GTA. In Canada the National Packaging Protocol (NAPP) is a national initiative that may lead to a substantial reduction in the quantities of packaging waste both produced and disposed. There is no such initiative being undertaken on a national scale by American industry, therefore paper and packaging waste trends predicted in the Franklin Report may not hold true for Canada.

The success of systems such as Germany's Green Dot initiative may have an influence on Canadian policy making. A number of product stewardship models and initiatives are being considered in Ontario at this time. If implemented, these would have a major impact on the amount of packaging and some other wastes generated and reused/recycled, and therefore the amount of packaging and some other wastes disposed would decrease by the year 2000 and beyond. Packaging stewardship models under consideration may result in a shift to different packaging types depending on how levies are charged to fund the system.

Traditional manufacturing industries may be declining with the evolution of the economy. This will result in a reduction in the generation of waste from the manufacturing sector.

5.8.4 Long-Term Trends: 1995 to 2016

Predicting trends for the long-term ultimately depends on predicting human nature. Western society generally aims to increase wealth and to produce and consume more, rather than less. There is no reason to believe this will change in the future. Max Dublin in his work *Futurehype: The Tyranny of Prophecy* states that "many of the most respectable prophecies today still fly in the face of common sense and/or common decency" and that "there seem to be no real people in these visions of the future, no real life in the rich and sometimes puzzling way in which we experience it - only banal abstractions of life and neat little caricatures of people."

Long-term trends can be divided into three main categories; lifestyle, economics and technology. Each of these is discussed below:

5.8.4.1 Lifestyle

Waste generation and composition by the residential sector is likely to remain at current levels, or increase, unless significant lifestyle changes occur in the long term. Some of these may occur because of technological changes which impact on our lifestyle (e.g. the information age and shopping at home, elimination of paper newspapers and books with the development of user friendly computer screens, etc.). Others depend on an attitude shift away from consumerism, which will be very difficult to achieve.

James Snider, a consumer-education expert writing in The Futurist (ref: Shopping in the Information Age; November-December, 1992), points out that in 1800, a typical American had access to fewer than 300 products on sale in his or her hometown, while in 1993, a typical American person living in a metropolitan city of a million people has access to more than a million consumer products. The typical GTA resident probably has access to a similar number of products.

In *Limiting Consumption, Toward a Sustainable Culture* (The Futurist, July August, 1991), Alan Durning examines the factors which have created a consumer society, and why these will be difficult, if not impossible, to change. He feels that creating a sustainable culture will occur only slowly, and is a challenge that will last many generations. The article states that:

- In the U.S., per capita energy use has climbed 60% since 1950, car travel has more than doubled, plastic use has multiplied 20-fold, and air travel has jumped 25-fold.

- Japanese consumption has increased even more rapidly, however, older Japanese people still hold to their time honoured ethos of frugality.

- In the first half of the 1980's, per capita consumption of frozen prepared meals, rose more than 30% in most Western European countries. In Switzerland the rise was 180%.

- The collapse of the socialist governments in Eastern Europe has unleashed a tidal wave of consumerism. Seventy percent of those living in the former East Germany hope to enter the world's automobile class soon. The area is slated for the greatest number of new car factories in the world.

The ethics of sustainability are a hard sell to the population in general. The call to a simpler life is perennial through the history of the North American continent: the Puritans of Massachusetts Bay, the Quakers of Philadelphia, the Amish, the Shakers, the experimental utopian communities of the 1830's, the hippies of the 1960's, and the back-to-the-land movement of the 1970's. None of these movements were able to influence the population in general.

Mr. Durning feels that a number of factors have to change to slowly alter the consumer-focused North American culture. These include:

- Advertising: Access to young consumers will be limited by EC and US standards. Advertising practices have to change in a more fundamental way

- Shopping Culture: Shopping malls promote increased consumerism. Laws in Britain and Europe limit hours when shops can open. The focus needs to move away from the shopping culture

- Government Policies: Prices must reflect the true cost of goods, to guide the market to less damaging forms of consumption.

- Weak Household and Community Economies: at a personal level, commitment to non-material fulfilment is hard to sustain without the reinforcement of family, friends, and neighbours. Strong local institutions may be the only counterweight to vested interests.

Issues such as the concern for the environment will certainly have some influence on future development, but will not necessarily shape it. For example, despite society's concern for packaging waste, there has been a huge growth in at-home shopping. Many

futurists agree that this type of shopping will continue to grow. With the rise in home-shopping, it is reasonable to expect a growth in the package delivery business. These goods will have to be packaged individually, rather than in bulk. Despite the current emphasis on reducing packaging waste, this trend may lead to an increase in the amount of packaging waste generated over the long term.

Mail order shopping is experiencing rapid growth, and bulk shopping is also thriving. Chains such as the Price Club and Aikenheads warehouse-type outlets offer consumers large price discounts for no frill, buying-in-bulk shopping. Price Club and its competitors offer consumers most of their shopping needs under one roof, from patio furniture to pasta. Because consumers buy in larger quantities, there is often less packaging associated with this shopping behaviour, but it is difficult to quantify what the impacts are.

Faith Popcorn in the *Popcorn Report* points out that pre-packaged food sales are rising and that a Gallup Poll indicated that 86% of Americans who eat dinners at home during the week are eating pre-packaged or take-out food that they pick up or are having delivered. She indicates that "experts" predict that take-out food spending will rise at three times the rate of total food spending. This trend contradicts the health conscious trend with the emphasis on eating more healthy or organic-type food. The latter trend is likely practised by a small percentage of the total population, and not at a level where it will significantly impact overall lifestyle trends. Each of these trends would have an opposite effect on waste generation, as pre-packaged food produces more waste, whereas organic and natural foods are not pre-packaged and are bought fresh.

The Popcorn Report suggested a number of other trends, including the prediction that "home delivery will become a way of life, with holding tanks in the house for milk, soda, mineral water (all refrigerated), and bins for laundry soap and dog kibble, all delivered like home heating oil."

The upcoming generation are a significant factor in future waste generation trends. Today's children are much more aware of waste reduction and recycling than the current generations of adults are. They have grown up in an age where environmental concerns get more press than before, and environmental awareness is at an all time high in North America. It would be reasonable to assume that they will maintain these attitudes and habits when they are adults, and teach these values to their children (who may or may not accept these values).

It is difficult to combine the diverse opinions presented above into one vision of the future, and how our waste generating habits will change. For this reason, they are presented for information only, and not interpreted for numerical analysis in this study.

5.8.4.2 Economics

One of the major economic trends that will shape long term economic development well into the next century is globalization. The growth of rapid transportation and communication technologies has led to the globalization of the international economy. This has led to rapid economic growth in newly industrialized countries (NICs), many located in the Pacific Rim. South and Latin American economies may also undergo tremendous growth but will be one generation behind the Pacific Rim countries which have had a one decade head start.

Many of these countries are able to produce goods requiring high amounts of low skilled labour much more cheaply than Western industrialized countries. Over the long term there will be a shift in the location of these industries, from industrialized to non industrialized countries. These will be industries such as textiles, steel, certain forms of agriculture and certain primary industry segments such as pulp and paper. This will certainly have a major effect on the Ontario economy, by shifting the economy away from traditional primary manufacturing and resource-based industries. It is not clear at this stage what type of economic development will replace this phase-out of traditional industries, and create jobs in Ontario and the GTA in the future.

Overall, future employment trends in the GTA are toward greater increases in the finance, insurance and real estate, construction and wholesale sectors. Continued decreases are expected to occur in the manufacturing sector. Since 1981, manufacturing and commercial services have experienced the most significant decreases in employment opportunities.

The GTA will also be influenced by the further automation of jobs and loss of traditional manufacturing jobs. The slow growth of construction may displace blue collar jobs in the short term. A significant trend will be the continued emergence of a bi-polar service sector of: 1) highly rewarded educated management and professional service sector; 2) disproportionate numbers of workers in lower paying jobs, low income backgrounds, and under-educated workforce.

Second, it will create growth in high skill, high technology industries and value added products and services. As the NIC economies grow they will increase demand for high tech, knowledge driven products and services. These will include engineering skills, specialized materials and steel products, computers and communication equipment are the types of industries more likely to thrive in the North American economies. The growth in the NIC economies and the modernization of Eastern European economies will also create

a huge demand over the long-run for resources, especially minerals. If these are supplied by Canadian sources, it would minimize the impacts of a shift away from a resource based economy predicted by some futurists.

5.8.4.3 Technological Development

The growth of the information age and communications technologies will dominate technological development well into the next century. Computers will become even more prevalent in both industry and society in general. The huge increase in product choice being offered to consumers will lead consumers to be more selective about the products they want to receive information on or purchase. This will foster the growth of interactive television and other interactive media. This may in turn reduce the amount of advertising done on paper.

It is anticipated by many, including Bill Gates of Microsoft, that the next great boom will be in technology enabling different types of office equipment to communicate - i.e. the computer will be able to communicate with the photocopier etc. Many futurists believe the electronic age will greatly reduce the amount or even eliminate the use of paper in the office. However, this is has not been proven to date.

As certain resources continue to become scarcer and their prices increase, technologies will develop that use these resources more efficiently and reduce waste. This is already happening in a number of different industries, as outmoded methods are replaced with state of the art equipment which operates more efficiently.

The "high-tech" age will produce more computer and other electronics related waste. This type of equipment quickly becomes obsolete and gets replaced. It cannot help but become a major waste stream unless parts can be reused. Reselling obsolete equipment to lesser developed countries whose equipment is even more obsolete and where new equipment is prohibitively expensive is already a thriving new industry and will probably continue to grow.

6.0 AVAILABLE ALTERNATIVES TO WASTE DISPOSAL IN THE GTA

This chapter discusses the range and types of alternative system components that were considered in the development of GTA waste diversion systems.

6.1 Reduction, Reuse & Recycling

The WMA specifies that the environmental assessment of alternatives to a landfill waste disposal site in each of the three primary services areas include a description of rationale for evaluation of any matters relating to reduction of waste, and recycling of materials. As noted earlier, the approach taken in this report is to look at the range of reasonable approaches to reduction, reuse and recycling (3Rs), as opposed to the general practice. Each of these reasonable approaches is termed as alternative 3Rs system. To arrive at these systems, specific waste diversion themes were examined.

6.2 Existing and Potential 3Rs Components

This section discusses the waste diversion components which can be combined to form waste diversion systems for the GTA.

Reduction and Reuse (Residential and IC&I)

Reduction components refer to those components that prevent waste from being generated and requiring management by the diversion or disposal system. In some jurisdictions source reduction is defined as any measure which lessens the quantity of waste requiring disposal at the curb.

Reuse components refer to the use of a material (which would otherwise have been discarded) in some beneficial manner without the need for additional processing to alter the state of the material. There is significant overlap between reduction and reuse, hence these components are listed together. Examples of Residential and IC&I Reduction and Reuse components include:

- Funding/distribution of source reduction equipment (backyard composters, cloth shopping bags etc.);
- A change in package design to reduce the quantity of packaging waste generated by the consumer;

- Create waste reduction offices in each Region with the primary objective or promoting reduction and reuse; and

- Process change in manufacturing to reduce the quantity of waste generated.

Residential Recycling and Collection

Residential Recycling and Collection refers to components that involve the various systems for collecting secondary materials from households for subsequent processing and diversion. For example:

- Curbside collection of Blue Box materials (bag, cart).

Residential Leaf and Yard Waste Collection

Residential Leaf and Yard Waste Collection refers to the systems in place for collecting these materials from residential sources for subsequent processing, such as:

- Seasonal curbside collection of leaf and yard waste.

Residential Household Composting

Composting can be used to process most organic components of the waste stream. Composting can be carried out at the point of generation, (as in backyard or community systems) or at a centralized facility. Different streams can be combined, and the degree of source separation (which affects finished compost quality) can also vary. An example of a Residential Household Composting component includes:

- Backyard composters.

Other Residential Waste Diversion

Other residential waste diversion components include systems for collecting or providing alternatives to disposal for materials that are not usually incorporated in traditional Blue Box processing. For example:

- White goods collection and drop-off.

Composting Facilities

There are several different techniques used in centralized composting that form composting facility components including, for example:

- Centralized windrow composting of source separated organics.

Reuse Centres

Reuse centres provide formal opportunities for residential and IC&I goods exchange and reuse. This component includes:

- Social Service Centres
- Reuse Building Centre
- Waste Exchange, etc.

Processing

Processing components address processing of dry recyclables and other dry materials into a form suitable for sale to secondary materials markets. An example would be:

- Processing of source separated or commingled dry recyclables in a material recovery facility (MRF).

Residential Recycling Depots/Transfer Stations

These components are comprised of opportunities provided to residents to bring materials to designated locations for subsequent processing and/or diversion. An example of these components includes:

- Provide adequate depots for all neighbourhoods in GTA to compliment existing Blue Box system.

Residential Regulation

Regulatory components have been divided into municipal, provincial, and federal categories. These regulatory components are designed to increases the diversion of residential waste by requiring some actions and activities on a mandatory basis. An example includes:

- No landfilling or incineration of unprocessed wastes.

Residential Programs

Residential program components describe programs that could be used by a region to permit or compel residents to participate more fully in waste diversion or to round out an existing system. For example:

- Allow residences to refuse delivery of unwanted "junk mail".

Residential Promotion/Education

Education of householders and promotion of 3Rs programs are considered the cornerstone of any successful 3Rs program and include components such as:

- Develop strong consumer education program to encourage bulk buying, refuse excess packaging, promote re-use, buy recycled, promote refillable containers etc.

Residential Economic Incentives

Residential economic incentives are regulatory actions that can be used to encourage participation in waste diversion activities, for example:

- Direct Cost system for garbage collection at curbside.

Residential Market Development Policies

Residential market development program components would be applied by a municipality to create markets for secondary materials and thus strengthen the economic viability and sustainability of 3Rs programs. For example:

- Integrate waste diversion with economic development programs to create markets for secondary materials.

IC&I Hauling, Recycling and Storage

IC&I Hauling and Recycling refers to components that involve the various systems for collecting secondary materials from IC&I locations for subsequent processing and diversion such as:

- Provision of bins at major IC&I facilities (e.g. hospitals, schools, shopping malls, etc.).

IC&I Composting

Composting can be used to process the wet (food and yard waste) part of the IC&I waste stream. Composting may be carried out at the point of generation, (as in on-site composting) or at a centralized facility. An example of an IC&I composting component includes:

- On-site composting of IC&I organics (vermi-composters and other by restaurants, schools, grocery stores, etc.).

IC&I Reuse

IC&I Reuse involves the second "R" of the 3Rs hierarchy, and includes materials exchange and reuse, to continue use of material in its original form. This component includes:

- Ontario Waste Exchange; and

- Use of refillable, reusable packaging (e.g. plastic pallets).

IC&I Recycling Depots/Transfer Stations

This component describes an opportunity provided to IC&I operations to bring materials to designated sites for subsequent processing and/or diversion, and includes:

- Provide adequate depots and transfer stations to be used by small IC&I generators to compliment existing Blue Box system.

MRFs/Processing for IC&I Sector

These components address processing of dry recyclables and other dry materials generated in the IC&I sector to a form suitable for sale to secondary materials markets. Examples include:

- Processing of source separated or commingled dry recyclables in a material recovery facility.

IC&I Regulation

This section includes components designed to increase IC&I involvement in waste diversion, for example:

- Mandatory source separation of IC&I recyclables (3Rs) regulations.

IC&I Programs

IC&I program components describe "miscellaneous" programs that may be used to encourage or facilitate fuller participation by elements of the IC&I sector in waste diversion. For example:

- Change approval process to require new IC&I facilities to design for reduction and re-use and submit a plan outlining these efforts prior to obtaining approval.

IC&I Promotion and Education

Education and promotion are considered cornerstones of any successful 3Rs program and include components such as:

- Expand strong 3Rs educational programs at all educational institutions (schools, universities, colleges etc.).

IC&I Economic Incentives

IC&I Economic Incentives are regulatory or self-generated actions that can be used to encourage participation in waste diversion activities among segments of the IC&I sector. For example:

- Economic incentives to encourage product re-design for durability, recyclability, and refillability.

IC&I Market Development Policies

IC&I market development components would be applied to create markets for secondary materials and thus increase the economic viability and sustainability for waste diversion. For example:

- Funding and incentives to recycling industries or other industries that utilize secondary materials.

7.0 3Rs SYSTEM DEVELOPMENT

7.1 Introduction

This chapter describes steps that were taken by the study team to develop alternative 3Rs systems for the residential and IC&I sectors. Following this, the detailed descriptions of the generic alternative systems are provided. Finally, detailed descriptions of each system, as they would apply to (or be applied in) each of the four GTA Regions analyzed in this study are also presented in this section.

7.2 Overview of the Alternative System Development Process

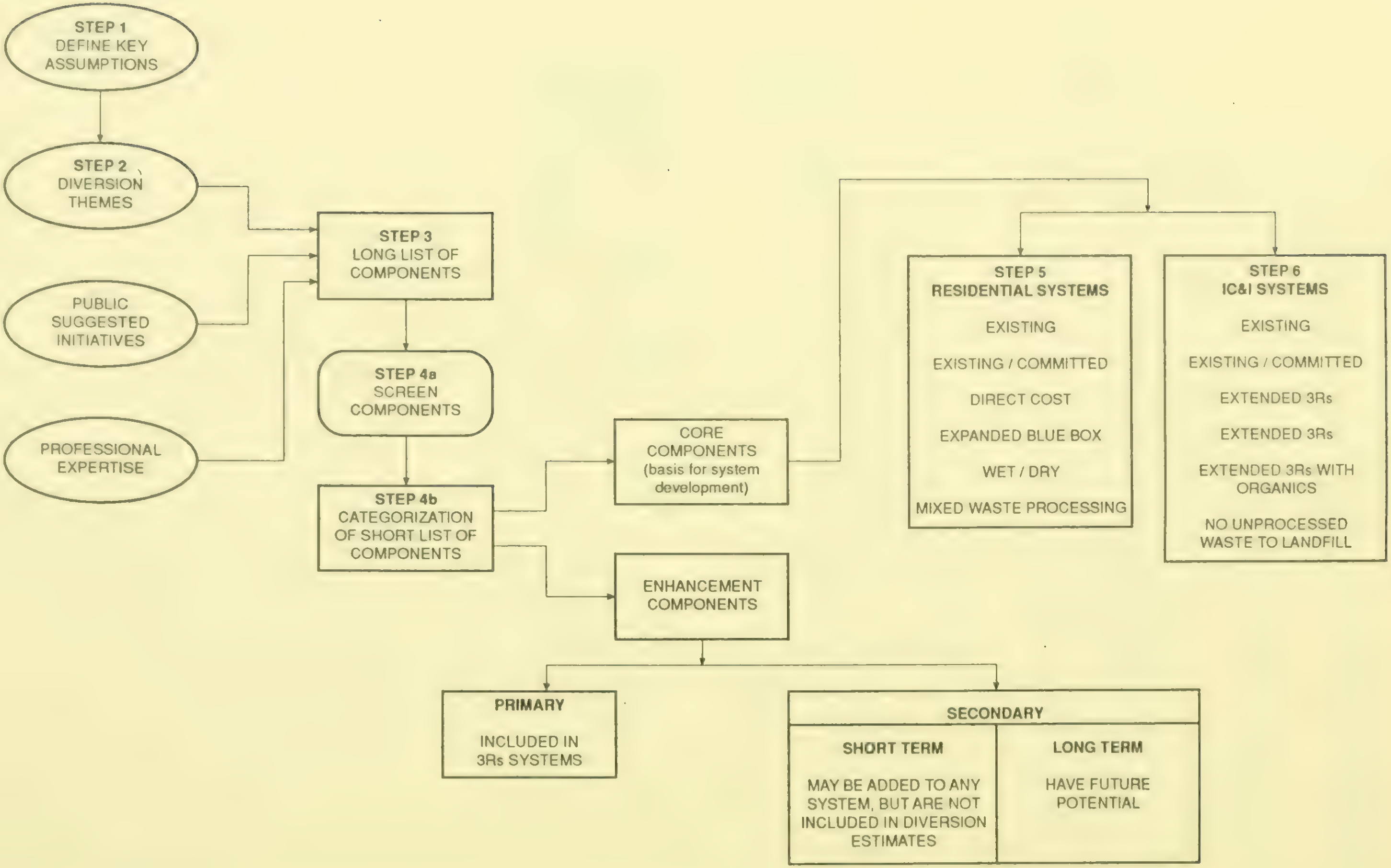
A range of six residential and six IC&I waste diversion systems were developed for comparison in the GTA 3Rs Analysis. In order to conduct this analysis, a methodical system development process was undertaken. The objective was to combine a wide range of alternative waste diversion components into logical systems which could potentially be used for waste diversion, without undue complexity, throughout the GTA. The method used for system development is illustrated in Figure 7.1.

The systems were developed to provide a basis for comparing alternative waste diversion approaches. **No attempt was made to analyze all possible systems, nor was this an attempt to provide conclusive recommendations of preferred systems for waste diversion in GTA Regions. The range of alternative systems developed were however considered to be reasonable for the GTA. It will also be the municipalities themselves who decide which system is most appropriate considering their own local issues/conditions.**

The system development process consisted of six steps:

1. Defining Key Assumptions
2. Identifying Waste Diversion Themes
3. Identifying Long List of Components
4. Screening Long List of Components
5. Developing Potential Alternative Residential Waste Diversion Systems for the GTA.
6. Developing Potential Alternative IC&I Waste Diversion Systems for the GTA.

The following discusses each of these steps.



GTA 3Rs ANALYSIS
3Rs SYSTEM DEVELOPMENT PROCESS

FIGURE 7.1

7.3 Step 1: Defining Key Assumptions

Several assumptions were necessary in order to suggest alternative waste diversion systems that might be applicable to the GTA. The assumptions developed by the study team for this purpose are as follows:

- The Existing system would be included in the analysis as the "do nothing" alternative. It would be defined as the 3Rs system in place within each Regional municipality as of December 31, 1992;

- Commitments made through five year Regional and municipal budgets and Federal and Provincial policies announced by 31 December 1992 were considered likely to occur, and were termed the Existing/Committed system. While each of the four Regional Municipalities would be affected by the same Federal and Provincial commitments, they differed with respect to Regional, municipal and private sector commitments;

- A "long list" of waste diversion components would be developed (as explained in Section 7.5.1). This would be a list of any components that *could* theoretically be applied in any or each of the GTA Regional Municipalities for waste diversion;

- Residential and IC&I waste diversion would be analyzed separately for each GTA Region. However, because there is no effective waste management boundary for IC&I waste and recyclables (IC&I waste management crosses municipal boundaries), IC&I systems would be developed for the GTA as a whole.

7.4 Step 2: Identifying of Waste Diversion themes

A set of seven waste diversion themes were developed as one of several inputs to development of the long list of components. The diversion themes helped highlight elements that *could* be included in waste diversion systems. A review of 3Rs initiatives suggested through the SWEAP, SWISC and IWA public consultation processes was also conducted to identify potential components for the long list. A review of comparable systems in Ontario and world-wide systems contributed to development of a wide range of alternative waste diversion themes.

The diversion themes described various approaches to waste diversion. Any of these diversion themes *could be* added to present activities in the Regions. The diversion themes considered included:

1. Comprehensive Source Separation without Central In-Vessel Composting
2. Wet/Dry Collection and Processing
3. End of Pipe, Mixed Waste Processing
4. Product Stewardship
5. Economic Instruments
6. Promotion/Education, and
7. Generator Based Source Reduction and Reuse.

The diversion themes are described in Appendix D of this document. It should be noted that none of these diversion themes were developed directly into alternative 3Rs systems on their own. Instead, the diversion themes were used to identify a number of elements that might be incorporated in a waste diversion system.

7.5 Step 3: Identifying the Long List of Components

A "long list" of waste diversion components was developed for screening in this study. A "long list" is made up of elements which represent a variety of waste diversion technologies, policies, and techniques that *may be* incorporated in waste diversion systems.

The "long list" was developed from information from three major sources. The waste diversion themes identified in the previous section were used to help identify components that would be included in the "long list". The study team analyzed the Existing and Existing/ Committed systems in the GTA to identify their essential component parts. This was combined with comments provided by the public to develop a comprehensive "long list" of potential system components for further evaluation.

7.6 Step 4: Component Screening and Categorization

7.6.1 Step 4A: Component Screening

The component screening for Residential and IC&I components was guided by three criteria. For a component to be retained for further consideration, each criterion had to be satisfied. The criteria are described below:

Criterion 1: A component must represent a proven technology, technique, policy and/or program

This criterion is defined to represent technologies, techniques, policies and/or programs which had the intention of diverting waste and have been successfully implemented in at least one other jurisdiction (world wide). If a component is not successfully implemented at full scale at this time but was considered to have potential for successful implementation in the future, the component was retained as a "secondary enhancement long term component" (described below).

Criterion 2: A component must satisfy government policy, regulations and standards

This criterion addresses whether a given technology, technique, policy or program is consistent with stated government policy and also meets current regulations and standards. Components requiring new legislation or amendments to existing legislation were not necessarily screened out on this basis, provided that they would not contradict existing policy.

Criterion 3: A component must reduce the quantity of waste requiring final disposal

Under this criterion, a technology, technique, policy or program must demonstrate an ability to divert a reasonable amount (which was defined generally as at least 1% for the purpose of this study) of waste from disposal. If a component was known to be beneficial (e.g. promotion/education) but measured data on diversion impacts were not available, the component was retained for inclusion in the systems.

Components which met the screening criteria discussed above formed the "short list" of components which was used for system development for either and/or both of the Residential and IC&I systems.

7.6.2 Step 4B: Categorization of "Short List" Components

Waste diversion is an emerging field, and is very dynamic at this time. For this reason, a multi-level component categorization system was considered warranted for the component screening process. The multi-level screening process ensured that components which had future potential, but for which adequate data are not available at this time were not eliminated from future consideration.

Secondly, waste diversion systems contain many elements which can be combined in different ways to form systems. The number of permutations and combinations of components which could form systems is large. In order to limit the number of systems considered to a manageable number, the study team developed a category of essential components for system development, and a second category of optional components which can be considered as a menu of options to add to any of the systems considered.

Categorization of components enabled the study team to specify the role that each component would play in development of alternative waste diversion systems for the GTA.

Components which had satisfied the screening criteria discussed above were classified as either core components or enhancement components. The purpose of each category is described below:

Core Components

Core components consist of a technique, technology or policy that could serve as the focus of a distinguishable alternative waste diversion system. Most core components consist of a type of technology (including collecting and processing elements) around which a system can be developed. As an example, collection of dry recyclables, and processing of dry recyclables in a MRF would be core components of an Expanded Blue Box program. If a specific policy was considered likely to contribute substantially to waste diversion system, it could also be retained as a core component. Therefore, some systems include regulatory measures or economic instruments as core components.

Enhancement Components

Enhancement components *could be* added to systems to enhance system performance and increase waste diversion. Enhancement components were further divided into primary and secondary enhancement component categories. **Only core and primary enhancement components were included in alternative waste diversion systems developed for analysis in the GTA.** A description of each enhancement component category is presented below:

Primary Enhancement Components

Primary Enhancement Components were used along with core components to build alternative waste diversion systems. These components (e.g. promotion and education) are proven to add an important element that would contribute to the function of a waste diversion system. The key distinction between primary and core components is that while core components can form the basis of a system, no system

would be built around a primary enhancement component. In many cases, components that presently exist in GTA systems were included as primary enhancement components.

Secondary Enhancement Components

Secondary Enhancement Components were components that were considered to have potential for inclusion in the different systems developed. They could be added to systems to increase waste diversion but were not considered critical to their function. Because of this, no secondary enhancement components are included in the alternative waste diversion systems developed for this study.

The Secondary Enhancement category was further divided into:

Immediate Secondary Enhancement Components

These were components with immediate potential (e.g. landfill bans on leaf and yard waste, storage of recyclables, deposit systems, product stewardship) which could be added in the immediate future to enhance the performance of any of the systems considered.

Long Term Secondary Enhancements

These were components that indicated potential for waste diversion (e.g. funding incentives to product manufacturers) but may not have been fully proven at this time. These were classified as long term secondary enhancement components and were retained for future consideration.

Table 7.1 summarizes the defining features of each component category.

TABLE 7.1
SUMMARY OF COMPONENT CATEGORIZATION PROCESS

Component Category	Defining Feature	Comments
Core Component	Provides basis for waste diversion system development	
Primary Enhancement Component	Used with core components to develop complete waste diversion system	Component lacks ability to form basis of an alternative system on its own Components that offer less than 1% diversion but are still considered beneficial may be retained up to this level
Secondary Immediate Enhancement Component	Components indicate immediate potential but are not crucial to function of any one system	Components not included in any waste diversion systems developed for GTA 3Rs Analysis, but could be added to systems to enhance performance
Secondary Long-Term Enhancement Component	Components are not proven at this time but may have potential over the long term	Components not included in any waste diversion systems developed for GTA 3Rs Analysis
Screened Out	Components are not currently proven Components contradict government policy Components contribute less than 1% to waste diversion	Components are removed from long list and receive no further analysis

This resulted in a list of 19 core and 55 primary enhancement components which were used to develop waste diversion systems for the GTA 3Rs Analysis.

Table 7.2 presents the "long list" of components analyzed in this study and the results of the component screening and categorization process. For ease of presentation, components are presented in Table 7.2 under the following headings:

RESIDENTIAL COMPONENTS	IC&I COMPONENTS
Reduction and Reuse (Residential and IC&I	IC&I Hauling Recycling and Storage
Residential Recycling and Collection	IC&I Composting
Residential Leaf and Yard Waste Collection	IC&I Reuse
Residential Household Composting	IC&I Recycling Depots/Transfer Stations
Other Residential Waste Diversion	MRFs/Processing for IC&I Sector
Composting Facilities	IC&I Regulation
Reuse Centres	IC&I Programs
Processing	IC&I Promotion/Education
Residential Recycling Depots/ Transfer Stations	IC&I Economic Incentives
Residential Regulation	IC&I Market Development Policies
Residential Programs	
Residential Promotion /Education	
Residential Economic Incentives	
Residential Market Development Policies	

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
RESIDENTIAL											
1.0	Reduction and Reuse (Residential and IC&I)										
1.1	Funding distribution of source reduction equipment (backyard composters, cloth shopping bags etc.)	exists to some extent in GTA Regions	proven	N/A	reduces quantity		✓				Retain on basis that component reduces waste and technology is proven
1.2	Create waste reduction offices in each Region with the primary objective of promoting reduction and reuse	exists to some extent in GTA Regions	likely effective, not proven in quantitative way	N/A	likely reduces quantity over time		✓				Retain on basis that offices currently exist and contribute to waste reduction
1.3	Establish community based (i.e. municipal, non-profit, charitable, etc.) reuse/ repair and goods exchange centres	exists to some extent in GTA Regions	proven to divert waste from disposal	N/A	reduces quantity		✓				Retain on basis that component is proven and can reduce quantity of waste disposed
1.4	Support the efforts of charitable organizations and food reuse organizations	exists to some extent in GTA Regions	proven to divert waste from disposal	N/A	reduces quantity		✓				Retain on basis that charitable organizations contribute to reuse
1.5	Promotion of grass-cycling and xeriscaping	exists to some extent in GTA Regions	proven	N/A	reduces quantity		✓				Retain on basis that the component contributes to reduction of grass in waste stream
1.6	Landfill ban on leaf and yard wastes, to force increased management on residential property	not in GTA at present	proven	N/A	reduces quantity			✓			Retain on basis that the component is considered a valuable enhancement to any diversion system since the component contributes to diversion of leaf and yard waste
1.7	Eliminate pick-up for leaf and yard waste (Oakville has implemented ban on grass pick-up)	exists in Halton at present	proven	N/A	reduces quantity			✓			Retain on basis that component encourages homeowners to manage leaf and yard waste on site and contributes to diversion of leaf and yard waste.
1.8	Increase use of refillable/reusable packaging and products	carried out on voluntary basis in GTA	proven	may require government regulations	reduces quantity			✓			Retain on basis that the component decreases use of disposable packaging and products, and therefore contributes to waste reduction through reuse

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
1.9	Landfill bans on recyclable material	exists to some extent in GTA	proven	N/A	decreases quantity disposed in GTA landfills			✓			Retain on basis that the component encourages increased recycling and therefore contributes to waste diversion
1.10	Waste reduction planning requirements for construction/demolition projects	exists to some extent in GTA	likely to reduce quantities	required under new MOEE regulations	likely to increase use of secondary materials and reduce disposed waste over time			✓			Retain on basis that the component encourages consideration of waste diversion in construction planning which will lead to waste diversion
1.11	Procurement ordinances (favouring durable products, recycled content, and/or reusable purchases)	exists to some extent in GTA	likely to reduce quantities	N/A	likely to increase use of secondary materials and reduce disposed waste over time			✓			Retain on basis that the component promotes use of reusable and durable goods which reduces generation of waste
1.12	Local product or packaging bans	not in effect in GTA at this time	in place in state of Maine (aseptics); effects on generation of other wastes unknown (may increase waste generation)	N/A	may increase quantities disposed by causing shift to other more wasteful packaging					✓	Screen on basis of uncertain and unproven waste diversion impacts
1.13	Promotion/education for school children focusing on waste reduction	in place in many/most GTA schools	proven	N/A	likely to have waste reduction impact over longer term		✓				Retain on basis that this increases participation in existing waste diversion programs and will result in long term benefits (of consumer education)
1.14	Economic incentives such as Direct Cost for garbage disposal (see later section on economic incentives)	not in GTA for residential waste at this time	proven	changes to Municipal Act will provide required powers	reduces quantity	✓					Retain as core component on basis that this provides strong economic incentives for waste diversion which has proven to increase waste diversion in many jurisdictions
1.15	Promotion/education program for consumers focusing on purchasing habit changes to minimize waste generation (for example bulk buying, borrowing items, buying products in recyclable packaging etc)	in GTA at this time	effect not measured, but likely to cause behaviour change over time	N/A	likely to reduce quantity			✓			Retain on basis that the component promotes a change in consumption habits which results in decreased waste generation
1.16	Product redesign for increased product life and durability	uncertain of degree to which this occurs in GTA - products sold in GTAs manufactured world-wide	increased durability would decrease discard rate	N/A	likely reduction quantity over time				✓		Retain on basis that the component results in decreased waste generation (due to longer product life) over the long term

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions: Durham Peel Metro York	Screening Criteria: Unproven Technology or Techniques	Screening Criteria: Strategy Fails to Satisfy Government Regulations and Standards	Screening Criteria: Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Screening Conclusion: Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
1.17	Packaging redesign to reduce quantity and weight (light weighting)	parts and packaging sold in GTA manufactured world-wide, some packaging redesign underway by Canadian companies to comply with NAPP	will reduce packaging waste (e.g. 30% of residential wastes)	NAPP, a voluntary federal initiative, already targets packaging waste	reduces quantity				✓		Retain on basis that the component results in decreased waste generation (due to reduced packaging waste) over the long term
1.18	Promote reuse (refillable packages, reuse centres)	in GTA at this time	re-use activities reduce waste going to disposal - uncertain of the extent to which promotion impacts reuse	N/A	likely to reduce quantity slightly by encouraging reuse		✓				Retain on basis that increased reuse leads to decreased use of disposable packages and products, thereby reducing the waste stream
1.19	Deposit/refund systems for a variety of materials	in place for some materials (beer bottles)	proven	N/A	reduces quantity			✓			Retain on basis that deposit/refund systems contribute to increased recovery of materials. Provincial legislation required for implementation
1.20	Hold community source reduction workshops	not in place in GTA	proven at pilot scale (e.g. Maxville Kenyon)	N/A	likely to reduce quantity (amount not easily quantified)			✓			Retain on basis that the component encourages source reduction behaviour
1.21	Develop "pre-cycling" campaign	not in place as major programs	impacts not proven quantitatively, likely to cause change in behaviour over time	N/A	likely to reduce quantity over time			✓			Retain on basis that educating consumers results in improved source reduction behaviour and decreased waste generation
1.22	Develop award system to recognize waste reduction achievements	in place in GTA	proven (e.g. RCO awards)	N/A	likely to reduce quantity in directly		✓				Retain on basis that the component currently exists and contributes to waste reduction
1.23	Organize SWAP days or neighbourhood garage sales	exists to limited extent in GTA	proven	N/A	minor impact		✓				Retain on basis that the component currently exists and results in decreased waste generation
1.24	Develop infrastructure for distribution of high quality food from catering facilities (e.g. Second Harvest)	in place through efforts of Second Harvest	proven	may be some limitations due to liability and public health concerns	reduces quantity			✓			Retain on basis that the component currently exists and provides best end use

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
										Enhancement				
											Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
1.25	Use food waste as animal feed	in place and used by GTA generators				proven	Ministry of Agriculture limitations on approach when feeding pigs; no limitations for other animals	reduces quantity		✓				Retain on basis that the component currently exists and successfully reduces the amount of food waste disposed and results in valuable secondary use of the food
1.26	Landspread food waste	in place and used by GTA generators				proven	reviewed on a case by case basis by MOEE	reduces quantity		✓				Retain on basis that the component currently exists and food waste is diverted to a useful purpose
1.27	Restrict advertising to airwaves (to minimize paper production) (Int)	not in place in GTA				unproven	unlikely that this can be implemented	if implemented, would reduce paper waste significantly					✓	Although this may result in waste diversion, the component has not been proven and may constitute unfair business practices. Screen on basis of unproven technique
1.28	Provide neighbourhood leaf shredders in fall	not in GTA				assume proven	N/A	would reduce quantity of disposal if leaves put to alternative uses			✓			Retain on basis that the component may encourage increased diversion of leaf waste
2.0	**Residential Recycling and Collection**													
2.1	Curbside collection of Blue Box materials (bag, cart) (with expanding collection)	Y	Y	Y	Y	proven	required in forthcoming MOEE regulations	reduces quantity	✓					Retain on basis that the component currently exists in GTA (and elsewhere) and has contributed to waste diversion
2.2	Curbside collection of Expanded Blue Box materials (ONP, OCC, boxboard, PET, HDPE, film and other plastics, glass, aluminum, tinplate steel, mixed paper, fine paper, textiles)	N	Y	N	N	proven	N/A	reduces quantity	✓					Retain on basis that the component currently exists in GTA and has contributed to waste diversion
2.3	Collection of all dry waste in a 2-stream wet-dry system	N	N	N	N	proven	conflicts with government policy	reduces quantity					✓	While the component may contribute to waste diversion, this component conflicts with government policy
2.4	Collection of all dry recyclables and waste in a 3-stream wet-dry system	N	N	N	N	proven	N/A	reduces quantity	✓					Retain on basis that the component has proven successful in diverting waste

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards.	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
2.5	Collection of all dry recyclables in a 4-stream wet-dry system	N	N	N	N	proven	N/A	reduces quantity			✓			Retain as immediate secondary enhancement, potential variation of 3-stream system design
2.6	Collection of recyclables at all multi-family dwellings	N	N	N	N	proven	N/A	reduces quantity		✓				Retain as essential element of providing comprehensive waste diversion services to householders in GTA
2.7	Recycling services to all rural households in GTA (depot, curbside)	N	N	N	N	proven	N/A	reduces quantity		✓				Retain on basis that the component would increase diversion
2.8	Drop-off depot system for dry recyclables and other (e.g. bulky) materials	Y	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain on basis that the component would provide increased opportunities for diversion
2.9	Collection of dry recyclables in a mixed waste collection system	N	N	N	N	limited success	conflicts with forthcoming MOEE regulations	reduces quantity					✓	Screen on basis that component conflicts with government policy for source separation
2.10	Curbside collection of wet household kitchen waste	N	N	N	N	proven at pilot scale	N/A	reduces quantity		✓				Retain on basis that the component contributes to diversion of wet wastes not handled by existing recycling systems
2.11	Curbside collection of household organics in a 2-stream wet-dry collection system	N	N	N	N	proven at pilot scale	conflicts with government policy	reduces quantity					✓	Screen on basis that a 2-stream collection system conflicts with government policy
2.12	Curbside collection of household organics in a 3-stream wet-dry collection system	N	N	N	N	proven at pilot scale	N/A	reduces quantity	✓					Retain on basis that the component contributes to increased waste diversion
2.13	Curbside collection of household organics in a 4-stream wet-dry collection system	N	N	N	N	proven at pilot scale	N/A	reduces quantity			✓			Retain as immediate secondary enhancement of 3-stream system design
2.14	Special/separate collections at curbside	Y	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain on basis that the component provides opportunities to divert waste conveniently

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
2.15	Collection of dry recyclables from multi-family buildings containing 6 or more units	Y	Y	Y	Y	proven	complies with proposed 3Rs regulations	reduces quantity		✓				Retain on basis that the component contributes to increased waste diversion
2.16	Collection of 3rd bag of waste for further processing	N	N	N	N	proven	N/A	reduces quantity	✓					Retain on basis that the component contributes to increased capture and diversion of recyclable materials resulting in decreased waste disposal
3.0	**Residential Leaf and Yard Waste Collection**													
3.1	Seasonal curbside collection of leaf and yard waste	Y	Y	Y	Y	proven	meet 3Rs regulations	reduces quantity		✓				Retain on basis that the component provides opportunities to divert leaf and yard waste conveniently
3.2	Drop-off depots for leaf and yard wastes	Y	Y	Y	Y	proven	meet 3Rs regulations	reduces quantity		✓				Retain on basis that the component provides opportunities to divert leaf and yard waste
4.0	**Residential Household Composting**													
4.1	Distribution/provision of backyard composters (at specified levels) for backyard composting by single family residents	Y	Y	Y	Y	proven	•N/A	reduces quantity		✓				Retain on basis that the component provides opportunities to divert residential organics resulting in increased waste diversion
4.2	Backyard composting (large 3-bin units) for multi-family residents	N	N	Y	N	proven	•N/A	reduces quantity		✓				Retain on basis that the component provides additional opportunity to divert residential organics resulting in increased waste diversion
4.3	Vermicomposting by multi-family residents	Y	Y	Y	Y	proven	•N/A	reduces quantity		✓				Retain on basis that the component provides additional opportunity to divert residential organics resulting in increased waste diversion

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
5.0	**Other Residential Waste Diversion**													
5.1	Household hazardous waste (including mobile HHW depots)	Y	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain on basis that the component provides an opportunity to divert an additional element of the waste stream resulting in increased waste diversion
5.2	Toxic taxi	N	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain on basis that the component provides a convenient opportunity to divert an additional element of the waste stream resulting in increased waste diversion
5.3	White goods collection and drop-off	Y	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain on basis that the component provides a convenient opportunity to divert additional elements of the waste stream resulting in increased waste diversion
5.4	Special/separate collections at curbside for bulky waste (white goods, furniture, Christmas trees, etc)	Y	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain on basis that the component provides a convenient opportunity to divert additional elements of the waste stream resulting in increased waste diversion
6.0	**Composting Facilities**													
6.1	Centralized windrow composting of source separated organics	N	N	N	N	proven	N/A	reduces quantity			✓			Retain as secondary immediate component on basis that the component results in increased waste diversion but may experience odour problems
6.2	Centralized windrow composting of mixed waste (third bag)	N	N	N	N	unproven	compost quality fails current standards and causes odour problems	reduces quantity					✓	Screen on basis that technology is unproven and may cause odour problems
6.3	Centralized windrow composting of mixed waste	N	N	N	N	technology experiences ongoing problems	conflicts with proposed MOEE regulations	reduces quantity					✓	Screen on basis that component conflicts with proposed MOEE 3Rs regulations

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
									Core	Enhancement			Screened Out	Rationale
										Primary	Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal			Immediate	Long Term		
6.4	Centralized in-vessel composting of source separated organics	N	N	Y	N	proven	N/A	reduces quantity	✓					Retain on basis that the component is an appropriate processing technology for and an essential element of a 3-stream collection system
6.5	Centralized in-vessel composting of mixed waste (third bag)	N	N	N	N	proven	N/A	reduces quantity	✓					Retain on basis that the component is a required processing technology for third bag, to increase diversion
6.6	Centralized in-vessel composting of mixed waste	N	N	N	N	technology experiences ongoing problems	conflicts with proposed MOEE regulations	reduces quantity					✓	Although this technology may result in waste diversion, screen on basis of conflict with proposed MOEE 3Rs regulations
6.7	Community composting/gardening projects	in GTA				proven	compost can be used locally	reduces quantity		✓				Retain on basis that the component contributes to increased awareness of composting and results in waste diversion
6.8	Centralized windrow composting of leaf and yard waste	in GTA				proven	compost can be used locally	reduces quantity	✓					Retain as core component on basis that the component processes diverted leaf and yard waste
6.9	Use centralized anaerobic digesters	N	N	N	N	proven in Europe	N/A	reduces quantity			✓			Retain as secondary immediate component as potential substitute for aerobic composting
7.0	Reuse Centres													
7.1	Social Service Centres (i.e. Goodwill)	Y	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain on the basis that components exist and contribute to waste reduction through reuse
8.0	Processing													
8.1	Processing of source separated or commingled dry recyclables in material recovery facility (MRF) (improved or expanded as required)	Y	Y	Y	Y	proven	N/A	reduces quantity	✓					Retain as a core component as the component is proven technology for processing dry recyclables

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
										Enhancement				
											Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
8.2	Processing of mixed wet and dry waste in a Mixed Waste Processing Facility	N	N	N	N	proven	conflicts with government policy	reduces quantity					✓	Screen on basis of conflict with government policy
8.3	Processing third bag waste in a mixed waste facility	N	N	N	N	proven	N/A	reduces quantity	✓					Retain as core component as the component is a required processing technology for "third bag" of waste
8.4	Processing of single material streams (e.g. wood, tires etc) in custom designed facilities	Y	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain as processing component that contributes to waste diversion
8.5	Replace collection and processing equipment and approach with world-wide state-of-the-art technology (from Japan, Germany, etc.)	GTA systems use state-of-the-art technology when upgrading				being proven on an on-going basis	N/A	some techniques will increase waste diversion				✓		Retain as secondary long-term component on basis that new technologies may be developed to increase waste diversion
8.6	Use sophisticated sorting facilities which feed pyrolysis or gasification plants	does not exist in GTA				proven	conflicts with government policy in some cases	reduces quantity					✓	Screen on basis that incineration is contrary to provincial legislation
9.0	**Residential Recycling Depots/Transfer Stations**													
9.1	Provide adequate depots for all neighbourhoods in GTA to complement existing Blue Box system (located at transfer stations, landfill sites, etc.)	Y	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain on basis that the component provides an increased opportunity for waste diversion
9.2	Drop-off depot system for dry recyclables and other (e.g. bulky) materials	Y	Y	Y	Y	proven	N/A	reduces quantity		✓				Retain on basis that the component provides an increased opportunity for waste diversion
9.3	Drop-off depots for all household organics (food, other wet wastes and garden wastes)	N	N	N	N	proven	N/A	reduces quantity		✓				Retain on basis that the component provides an increased opportunity for organic waste diversion

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
									Core	Enhancement			Screened Out	Rationale
										Primary	Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal			Immediate	Long Term		
10.0	**Residential Regulation**													
10.1	Develop requirement that all waste received at landfill must be from designated processing facilities (no unprocessed waste to landfill)	N	N	N	N	proven	N/A	reduces quantity			✓			Retain as secondary immediate enhancement as potential method of increasing residential waste diversion
10.2	Mandatory source separation (3Rs) by residential sector	exists in Halton				proven	N/A	strategy increases waste diversion			✓			Retain as potential method of increasing participation in source separation programs
10.3	Landfill bans on a variety of materials	Y	Y	Y	Y	proven in GTA	N/A	reduces quantity for disposal		✓				Retain on basis that the component encourages increased recycling and therefore contributes to waste diversion
10.4	Flow control (delivery of residential waste to designated facilities)	does not exist in GTA				implementation being overturned in U.S.	conflicts with government policy	does not necessarily reduce quantity					✓	Screen on basis of conflict with government policy
10.5	Require municipalities in GTA to achieve designated diversion targets	not currently enforced at municipal				proven	N/A	may assist in reducing quantity			✓			Retain as immediate secondary component on basis that mandatory targets increase diversion
10.6	Require municipalities in GTA to establish effective waste generation and diversion monitoring systems	in place for residential but not IC&I sector				proven	N/A	may assist in reducing quantity			✓			Retain as immediate secondary component on basis that good feedback increases system performance
10.7	Ban non-recyclable packaging products	not currently enforced at municipal level				effects not proven or quantified	N/A	may assist in reducing quantity					✓	Screen on basis of unproven results of policy
10.8	Change compost quality standards to allow more widespread use of compost	provincial jurisdiction				unproven	inconsistent with stated government policy	strategy likely to reduce quantity of waste requiring landfill					✓	Screen on basis of inconsistency with government policy
11.0	**Residential Programs**													
11.1	Reduce garbage collection frequency	Y	Y	Y	Y	proven	N/A	likely decreases quantity		✓				Retain on basis that the component currently exists and is likely to increase waste diversion
11.2	Set-out limit (bag limit) for garbage collection	N	N	N	Y	proven	N/A	likely decreases quantity		✓				Retain on basis that the component currently exists and may increase waste diversion

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
11.3	Reduce frequency of recyclables collection	Y	N	Y	N	proven	frequency at half of garbage collection frequency meets 3Rs regulations	does not increase waste diversion					✓	Screen on basis of failure to reduce waste requiring final disposal
11.4	Allow residences to refuse delivery of unwanted "junk mail"	on voluntary basis in GTA				not quantified	N/A	may reduce disposal			✓			Retain on basis of potential source reduction of junk mail
11.5	Reject loads with visible designated materials	Y	Y	Y	Y	proven	N/A	would reduce disposed waste			✓			Retain on basis that the component reduces disposal of recyclable materials
11.6	Develop landfill management practices which utilize disposed waste as cover material	N	N	N	N	proven	N/A	strategy preserves landfill capacity			✓			Retain on basis that component "reuses" waste materials as a resource
11.7	Produce compost on-site for landfill cover and preserve capacity	N	N	N	N	proven	N/A	strategy preserves landfill capacity			✓			Retain on basis that component displaces borrow material as daily cover in landfill
11.8	Volume based disposal fees	N	N	N	N	proven	N/A	may reduce quantities received			✓			Retain on basis that the component encourages increased diversion of low density materials
11.9	Disposal surcharges on some items (e.g. tires, white goods etc)	Y	Y	Y	Y	proven	N/A	may reduce quantities received		✓				Retain on basis that component exists and provides an economic incentive to increased waste diversion
11.10	Landfill mining to recover materials	N	N	N	N	proven	N/A	strategy preserves landfill capacity but does not directly reduce quantity of waste requiring disposal					✓	Screen on basis that the component does not meet third criterion; however strategy is of value to preserve landfill capacity
11.11	Establish scavenging centres at all landfills	N	N	N	N	proven	may contravene local by-laws	quantity of recoverable material may be very small					✓	Screen on basis of potential conflict with local by-laws; local by-laws that prevent scavenging should be reviewed
11.12	Differential tipping fees based on degree of processing or waste composition	Y	Y	Y	Y	proven	N/A	strategy encourages processing and increases quantity diverted		✓				Retain on basis that component exists and contributes to waste diversion

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions				Screening Criteria			Screening Conclusion					
										Enhancement				
											Secondary			
		Durham	Peel	Metro	York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Primary	Immediate	Long Term	Screened Out	Rationale
12.0 Residential Promotion/Education														
12.1	Expand strong 3Rs educational programs at all educational institutions (schools, universities, colleges etc.)	Y	Y	Y	Y	proven	N/A	reduces quantity but difficult to measure extent		✓				Retain on basis that component encourages participation leading to increased waste diversion (now and in the future)
12.2	Develop strong consumer education program to encourage bulk buying, refuse excess packaging, promote re-use, buy recycled, promote refillable containers etc.	Y	Y	Y	Y	proven	N/A	reduces quantity but difficult to measure extent		✓				Retain on basis that component exists and contributes to source reduction and waste diversion
12.3	Develop strong homeowner education program to focus on pre-cycling, backyard composting, grass-cycling, Direct Cost Expanded Blue Box, Wet/Dry reuse, etc.	Y	Y	Y	Y	proven	N/A	reduces quantity but difficult to measure extent		✓				Retain on basis that component contributes to behaviour change and increased waste diversion
12.4	Support community based educational program such as neighbourhood composting (e.g. Port Colborne)	Y	Y	Y	Y	proven	N/A	reduces quantity but difficult to measure extent		✓				Retain on basis that component encourages community activity, increases interest, awareness and participation in waste diversion activities
13.0 Residential Economic Incentives														
13.1	Direct Cost system for garbage collection at curbside	Direct Cost not in place				proven	N/A	reduces quantity	✓					Retain on basis that component provides visible economic incentive to increased waste diversion
13.2	Financial incentives to purchase durable products	not in place				unproven	N/A	difficult to design and administer programs to achieve waste reduction. Difficult to monitor waste reduction that is achieved due to these policies specifically.					✓	Screen on basis that strategy is unproven because ability of this type of policy to achieve waste reduction is not known and if implemented it would be difficult to monitor results achieved
13.3	Grant programs to support source reduction in residential sector	in place				proven, but hard to measure	N/A	assumed to reduce quantity			✓			Retain on basis of assumed waste diversion potential

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
13.4	Full cost accounting forcing municipalities to charge the full or total cost of waste management	in place in GTA	proven	N/A	reduces quantity			✓			Retain on basis that charging full costs of waste management would provide increased incentive to waste diversion
14.0 Residential Market Development Policies											
14.1	Integrate waste diversion with economic development programs to create markets for secondary materials	not in place	under consideration in many jurisdictions	N/A	over long-term, policy would stimulate secondary materials markets locally				✓		Retain as long term secondary component on basis that component appears to have potential to reduce waste, although specific impact on GTA waste diversion is uncertain
14.2	Mandate product stewardship with requirement for market development	not in place	proven in Germany	consistent with government policy	increases recovery thereby reduces quantity of waste to disposal			✓			Retain on basis that component reduces waste to final disposal
IC&I											
15.0 IC&I Hauling, Recycling and Storage											
15.1	Expand Blue Box system to cover all IC&I facilities who want to participate, with focus on institutional and commercial	N Y Y N	proven	N/A	reduces quantity			✓			Retain on basis that component would provide increase diversion by providing increased opportunities to recycle
15.2	Provision of bins at major IC&I facilities (e.g. hospitals, schools, shopping malls, etc.)	not provided in comprehensive manner	proven	N/A	likely to decrease quantity			✓			Retain on basis that recovery would increase through convenient opportunities to recycle
15.3	Collection of source separated dry recyclables	in place	proven	N/A	likely to decrease quantity	✓					Retain on basis that component exists and contributes to waste diversion
15.4	Collection of commingled dry recyclables from IC&I sector	in place	proven	N/A	likely to decrease quantity	✓					Retain on basis that component exists and contributes to waste diversion
15.5	Collection of source separated organics from IC&I sector	in place	proven	N/A	likely to decrease quantity	✓					Retain on basis that component exists and contributes to waste diversion

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions: Durham Peel Metro York	Screening Criteria: Unproven Technology or Techniques	Screening Criteria: Strategy Fails to Satisfy Government Regulations and Standards	Screening Criteria: Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Screening Conclusion: Core	Enhancement: Primary	Enhancement: Secondary: Immediate	Enhancement: Secondary: Long Term	Screened Out	Rationale
15.6	Collection of mixed waste from IC&I sector	in place	proven	N/A	reduces quantity disposed if subsequently processed and marketed		✓				Retain on basis that if material is processed, contributes to waste diversion
15.7	Long term storage of dry IC&I recyclables until recycling technologies developed and/or profitable/stable markets developed	does not exist in GTA	unproven	no apparent conflict with government policy	impact on diversion uncertain					✓	Screen on basis of unproven technology
15.8	Short term (3 to 6 month) storage of IC&I dry materials to take advantage of emerging recycling technologies and/or market prices	likely to exist informally in GTA	N/A	no apparent conflict with government policy	could reduce quantity of waste disposed			✓			Assuming stringent storage conditions met, may ensure successful diversion of large quantities of materials
16.0 IC&I Composting											
16.1	On-site composting of IC&I organics (vermicomposters and other by restaurants, schools, grocery stores, etc.)	exists at some GTA facilities	proven	meeting health regulations may be difficult for many generators	reduces quantity		✓				Retain on basis that component diverts waste
16.2	Centralized windrow composting of source separated organics	exists in GTA	proven, some intermittent odour problems	in some cases, odour problems occur, compost quality fails to meet MOEE guidelines for unrestricted use	reduces quantity		✓				Retain on basis that component diverts organics subject to maintenance of process quality control
16.3	Centralized in-vessel composting of source separated organics	N N Y N	proven	compost quality may present limitations for end uses	reduces quantity		✓				Retain on basis that component diverts organics subject to maintenance of process quality control
16.4	Centralized composting of leaf and yard waste	exists in GTA	proven	compost quality may present limitations for end uses	reduces quantity		✓				Retain on basis that component diverts organics subject to maintenance of process quality control
16.5	Use centralized anaerobic digesters	exists in GTA	proven	no apparent conflict with government policy	reduces quantity			✓			Retain as immediate secondary component as a technical option to aerobic composting for diversion of IC&I organics

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
16.6	Centralized in-vessel composting of mixed IC&I waste	does not exist in GTA	unproven; generally not applicable to IC&I waste as 93% is dry waste	conflicts with proposed MOEE regulations	slight quantity reduction					✓	Screen on basis of unproven technology and conflict with proposed MOEE 3Rs regulations
17.0 IC & I Reuse											
17.1	Ontario Waste Exchange	used by GTA generators	proven	N/A	reduces quantity		✓				Retain on basis that component exists and has proven effective in waste diversion through reuse
18.0 IC & I Recycling Depots/Transfer Stations											
18.1	Provide adequate depots and transfer stations to be used by small IC&I generators, to compliment existing Blue Box system	used by GTA generators	proven	N/A	reduces quantity		✓				Retain depots on basis that component provides increased opportunities to recycle
19.0 MRFs/Processing for IC&I Sector											
19.1	Processing of source separated or commingled dry recyclables in a material recovery facility (MRF)	in GTA	proven	N/A	reduces quantity	✓					Retain on basis that component exists, and is an essential element of existing successful waste diversion programs
19.2	Processing of mixed IC&I waste in a Mixed Waste Processing facility	not in GTA	proven	does not conflict with government policy assuming IC&I generators meet source separation requirements of 3Rs regulations	reduces quantity	✓					Retain on basis that component contributes to increased diversion of (predominantly dry) IC&I waste
19.3	Processing of single material streams (e.g. tire processing facility wood, tires, etc.) in custom designed facilities	in GTA	proven	N/A	reduces quantity		✓				Retain on basis that component exists and contributes to waste diversion
19.4	Construction/demolition waste processing at specialized salvaging operations	in GTA	proven	N/A	reduces quantity		✓				Retain on basis that component exists and contributes to waste diversion
19.5	Replace processing equipment and approach with state-of-the-art technology world wide (from Japan, Germany, etc.) as required	has occurred as required	only proven technologies should be used	assess on case-by-case basis	likely to contribute to increased waste diversion because of increased efficiency			✓			Retain on basis that this approach contributes to increased waste diversion through increased process efficiencies

TA 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
19.6	Rendering of food wastes	exists in GTA	proven	N/A	reduces quantity		✓				Retain on basis that component exists and contributes to food waste diversion
20.0 IC&I Regulation											
20.1	Develop requirement that all waste received at landfill must be from designated processing facilities (no unprocessed waste to landfill)	proven	proven	N/A	would reduce quantity landfill by encouraging diversion of processed waste	✓					Retain on basis that component is an effective method of ensuring consideration of waste diversion by IC&I sector
20.2	Mandatory source separation of various IC&I recyclables (WRAP regulations as basis) by expanding list of IC&I generators	committed system includes this requirement for some generators	proven	N/A	reduces quantity	✓					Retain on basis that component exists and contributes to IC&I waste diversion
20.3	Landfill bans on a variety of materials	in place in GTA	proven	N/A	reduces quantity disposed at GTA landfills		✓				Retain on basis that component exists and contributes to IC&I waste diversion
20.4	Ban non-recyclable packaging and products	not in place in GTA	unproven	needs to be implemented at provincial or federal level	impacts on disposed waste quantities not known (may increase)					✓	Screen on basis of uncertain and unproven waste diversion impacts
20.5	Require retailers and/or producers to establish recovery systems for designated products and packaging	not in place in GTA	this approach used in Germany (German Green Dot) and under consideration in Canada	N/A	likely to reduce quantity going to landfill by increasing recycling opportunities			✓			Retain on basis that component contributes to IC&I waste diversion
20.6	Deposit/refund system for soft drink containers	not in place in GTA	proven	N/A	reduces quantity to landfill			✓			Retain on basis that component is likely to increase recovery of specified materials and contribute to waste diversion
20.7	Deposit/refund system for all beverage containers (liquor, juice, milk, water, etc.)	not in place in GTA	this system being considered (but not yet fully implemented) by a number of jurisdictions; unproven	N/A	reduces quantity to landfill					✓	Screen on basis of unproven policy
20.8	Mandatory recovery rates and targets for specific materials	does not exist at this time	proven	N/A	reduces quantity			✓			Retain on basis that component is likely to increase waste diversion through increased recovery

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
20.9	Change current health and safety regulations to allow more uses for food waste, and limit liability to encourage greater participation in food waste diversion by IC&I sector	does not exist at this time	not proven but appears to have potential	potential conflict with government policy	may increase food waste diversion and decrease quantity being disposed					✓	Screen on basis that component requires amendments to existing legislation and likely conflicts with stated government regulations and standards
20.10	Change health and safety thresholds for use of secondary materials in food contact packaging or other products	under discussion provincially and federally at this time	impacts unproven, assumed to increase demand for recycled boxboard; under consideration by FDA (U.S.)	changes required to federal and provincial packaging standards; conflicts with government policy	impacts uncertain; assumed to increase demand for boxboard with recycled content, increasing market demand for fibres and therefore stimulate recycling					✓	Screen on basis that component fails to meet criteria
20.11	Change compost quality standards to allow more widespread use of compost	does not exist in GTA	impacts unproven	conflicts with current government standards	strategy could significantly reduce quantity to landfill					✓	Screen on basis that component conflicts with current government standards
20.12	Adopt product labelling system which promotes 3Rs	not in place; is currently implemented on voluntary basis	proven	N/A	impacts unproven					✓	Screen on basis of unproven impact on waste diversion
20.13	Minimum secondary material content for packaging and products	federal labelling system in place; is currently implemented on voluntary basis	unproven	N/A	impact unproven					✓	Screen on basis of unproven impacts on waste diversion
20.14	Tax industries creating excess garbage and packaging	does not exist in GTA	unproven	N/A	impact unproven					✓	May stimulate markets for secondary materials however screen on basis of unproven impacts on waste diversion
20.15	Eliminate economic subsidies to industry	not in place in GTA	unproven	N/A	impact unproven					✓	Screen on basis of unproven policy
20.16	Mandated levies or taxes to support 3Rs	exists to limited degree in GTA	proven	N/A	likely to increase diversion through increased financial support of 3Rs programs			✓			Retain on basis that component is likely to contribute to waste diversion through increased financial support of 3Rs programs
20.17	Pass legislation against over-packaging	addressed on voluntary basis through NAPP	unproven	N/A	impact uncertain					✓	Screen on basis of unproven policy

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GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
20.18	Ban use of polystyrene and similar products	does not exist in GTA	unproven	N/A	impact uncertain					✓	Screen on basis of unproven policy; bans have been implemented but may result in increased waste generation (e.g. paper waste vs. polystyrene waste)
20.19	Tax on virgin materials to develop markets for secondary materials	not in place	unproven at this time	may contravene GATT, NAFTA, and be considered a trade barrier	impacts non-specific and unknown					✓	Screen on basis of unproven policy
20.20	Mandatory waste audits for IC&I generators	carried out on voluntary basis in GTA	proven to reduce waste quantities in some cases	N/A	reduces quantity		✓				Retain on basis that component is an essential tool for IC&I waste diversion planning, leading to increased IC&I waste diversion
20.21	Flow control (delivery of IC&I waste to designated facilities)	does not exist in GTA	implementation being overturned in U.S.	conflicts with government policy	does not necessarily reduce quantity					✓	Screen on basis of conflict with government policy
21.0 IC&I Programs											
21.1	Change approval process to require new IC&I facilities to design for reduction and re-use and submit a plan outlining these efforts prior to obtaining approval	in place in some GTA Regions	proven	N/A	likely to contribute to waste diversion in long-term			✓			Retain on basis that the component encourages consideration of waste diversion in facility planning which will lead to waste diversion
21.2	Establishment of central food waste management organization to help food retailers to send excess food to food banks, or to animal feed if human consumption not viable	elements in place	not proven, but likely to be successful	there may be health and liability concerns which limit approach	if successful, waste to disposal would be reduced				✓		Retain as long term secondary component on basis that if successful, would likely result in increased diversion of food waste
21.3	Allow locations to refuse delivery of unwanted "junk mail"	being practised in GTA	proven	N/A	reduces quantity				✓		Retain on basis of potential source reduction of junk mail
21.4	Develop and implement a material use guideline	in progress by MOEE	proven	N/A	likely to reduce quantity			✓			Retain on basis that component provides options for beneficial use of materials that might otherwise be disposed. Content of guidelines will determine options for material management and impact on waste diversion

TABLE 7.2

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
22.0 IC&I Promotion/Education											
22.1	Expand strong 3Rs educational programs at all educational institutions (schools, universities, colleges etc.)	all GTA Regions provide IC&I education programs	limited experience exists with this type of program	N/A	likely to reduce quantity		✓				Retain on basis that component increases participation in existing waste diversion programs and will result in long term benefits (of consumer education)
22.2	Develop strong IC&I generator education program	all GTA Regions provide IC&I education programs	proven	N/A	likely to reduce waste over long-term		✓				Retain on basis that component provides information on waste diversion and likely contributes to increased waste diversion achievements by generators
22.3	Develop environmental design program at schools and colleges	exists in GTA	proven	N/A	not proven that competent directly reduces quantity disposed					✓	Screen component on basis of unproven impacts
22.4	Establish databank on waste reduction technologies and system design	exists in GTA (RCO, and other sources)	proven	N/A	may indirectly reduce quantity disposed			✓			Retain on basis that easy accessibility of data supports waste diversion
23.0 IC&I Economic Incentives											
23.1	Financial incentives to purchase durable products	not in place	unproven	N/A	likely to have minor impacts over long-term					✓	Screen on basis that component is not proven; will probably have minor impacts and may be administratively cumbersome
23.2	Grant programs to support source reduction	supported by MOEE at this time	proven	N/A	likely to have impacts over time		✓				Retain on basis that component encourages increased source reduction activities leading to waste diversion
23.3	Economic incentives to encourage product re-design for durability, recyclability and refillability	not in place	unproven	N/A	likely to have minor impacts over long-term					✓	Screen on basis that component is not proven, will probably have minor impacts and may be administratively cumbersome
23.4	Self-imposed levies by producers to support 3Rs	not at this time, but product stewardship models incorporate this approach	proven (German Green Dot)	N/A	would reduce quantity			✓			Retain on basis that component contributes to waste diversion
23.5	Advanced disposal fee for larger wastes and special categories of waste	not in place (as of September 1993)	unproven	N/A	may have positive impact over time					✓	Screen on basis that component is unproven

GTA REGIONS
SCREENING OF COMPONENTS FROM THE LONG LIST
(continued)

Component #	Components	Existing or Committed in GTA Regions	Screening Criteria			Screening Conclusion					
		Durham Peel Metro York	Unproven Technology or Techniques	Strategy Fails to Satisfy Government Regulations and Standards	Strategy Does Not Reduce Quantity of Waste Requiring Final Disposal	Core	Enhancement			Screened Out	Rationale
							Primary	Secondary			
								Immediate	Long Term		
24.0 IC&I Market Development Policies											
24.1	Funding and incentives to recycling industries or other industries that utilize secondary materials	funded through MOEE	proven	N/A	direct impact on waste diversion likely to be positive			✓			Retain on basis that component encourages development of markets for secondary materials
24.2	Funding incentives to product manufacturers to utilize secondary materials	exists to some extent	proven	N/A	diversion impacts not measured				✓		Retain on basis that component supports development of markets for secondary materials
24.3	Provide manufacturer tax credits to end users of secondary materials	not in place at this time	unproven	N/A	impacts unknown					✓	Screen on basis that component is unproven and impacts are unknown
24.4	Tax exemptions on recycling equipment	not in place at this time	unproven	N/A	may stimulate local recycling industry, but impacts on disposed quantities are uncertain					✓	Screen on basis that component impacts are unknown and policy is unproven
24.5	Exempt recycled products from sales tax	not in place at in GTA	unproven, but assume that it stimulates sales of recycled products	N/A	not known if this would impact on diversion from GTA landfills (impacts not localized)					✓	Screen on basis that impacts are not known (unproven)
24.6	Purchasing specifications to promote recycled content	in place by some private and public sector bodies in GTA (e.g. GIPPER)	proven	N/A	impact on GTA waste cannot be quantified			✓			Retain on basis that component stimulates markets for secondary materials and contributes to waste diversion (although at this time, specific impacts on GTA waste are not measured)

Table 7.3 presents an estimate of the waste diversion potential that *could be* achieved by each of the secondary enhancement components, based on available data culled from a variety of studies. For some of the secondary enhancement components, reliable data is not available at this time, due to lack of study etc. Where this is the case it has been noted. Table 7.3 provides an indication of additional diversion that *might be achieved* should these components be added to any of the alternative waste diversion systems studied in the GTA 3Rs Analysis.

7.7 Step 5: Development of Potential Alternative Residential Waste Diversion Systems for the GTA

7.7.1 Residential System Development

A set of six representative residential waste diversion systems was developed from the short list of core and primary enhancement components. The systems presented in this study do not span the full range of potential waste diversion systems that could be considered, and development of these particular systems does not imply a preference on the part of the authors.

This group of potential alternative systems was assembled as a *combination of waste diversion components* which could be added to the Existing or Existing/Committed waste diversion system in each Region, to further reduce the amount of waste which is currently disposed. The systems provided a basis from which to examine the potential for different approaches to waste diversion in GTA municipalities, but do not present a complete list of possible permutations and combinations of waste diversion system components to optimize diversion.

The Existing system was adopted as the "do-nothing" alternative. Any commitments made for waste diversion, at all levels of government, and by the private sector were also incorporated into the Existing/Committed system for each Region. In addition to these two systems, four additional residential waste diversion systems were developed. These systems present an array of distinctly different technological and/or policy-driven approaches to residential waste diversion. Components which were identified as "core" in Table 7.2 were combined with those identified as "primary enhancement components" were combined to form four additional residential waste diversion systems, which were:

- a "Direct Cost" system;
- an "Expanded Blue Box" system;
- a "Wet/Dry" system; and
- a "Mixed Waste Processing" system.

TABLE 7.3

POTENTIAL DIVERSION IMPACTS OF SECONDARY ENHANCEMENT COMPONENTS

Component #	Component Description	Immediate	Long Term	Comments
1.6	Landfill ban on leaf and yard wastes, to force increased management on residential property	√		Leaf and yard waste make up 2%-11% of disposed residential waste and 2% of disposed IC&I waste in GTA in 1992. A significant proportion of this would be diverted through a ban.
1.7	Eliminate pick-up for leaf and yard waste (Oakville has implemented ban on grass pick-up)	√		Leaf and yard waste make up 2% to 11% of the residential waste stream disposed in GTA in 1992. A significant proportion of this would be diverted through a ban.
1.8	Increase use of refillable/reusable packaging and products	√		Should decrease packaging waste by at least 18% , or more for overall reduction of 4.5% of waste stream. (See Appendix).
1.9	Landfill bans on recyclable material	√		Assume existing bans divert many IC&I recyclables. Policy would target residential recyclables. Recyclable materials make up 25% of the residential stream disposed. Ban would increase diversion. Assume 70% of remaining recyclables diverted; 17.5% diversion increment of residential stream would be achieved.
1.10	Waste reduction planning requirements for construction/demolition projects	√		Would reduce C&D waste generation by at least 10%, with long term waste diversion benefits.
1.11	Procurement ordinances (favouring durable products, recycled content, and/or reusable purchases)	√		Strengthens markets for secondary materials and reusable containers. Impacts on diversion difficult to quantify.
1.15	Promotion/education program for consumers focusing on purchasing habit changes to minimize waste generation (for example bulk buying, borrowing items, buying products in recyclable packaging etc.)	√		Effect not measured but likely to cause behaviour change over time, resulting in source reduction.
1.16	Product redesign for increased product life and durability		√	Increased durability would decrease discard rate, thus increasing diversion through source reduction. Measure would apply mostly to durable goods (4-8% of disposed residential waste stream).

Component #	Component Description	Immediate	Long Term	Comments
1.17	Packaging redesign to reduce quantity and weight		√	Would result in slight decrease in packaging waste (assume 1.5% diversion increment).
1.19	Deposit/refund systems for a variety of materials	√		Ensures high recovery (over 90%) of materials involved. If applied to all glass, metal and plastic food and beverage containers (8-10% of the residential waste stream), incremental diversion would be 1.6 to the 2% of residential waste stream.
1.20	Hold community source reduction workshops	√		Likely to reduce quantity of waste generated through increased awareness of source reduction (impact is not easily measured).
1.21	Develop "pre-cycling" campaign	√		Likely to cause behaviour change over time resulting in source reduction (3% measured in Colorado).
1.24	Develop infrastructure for distribution of high quality food from catering facilities (e.g. Second Harvest)		√	Applicable to IC&I sector food waste. Potential to divert some (assume 10%) of 7% of IC&I sector waste which is food, i.e. 0.4% diversion of total waste stream.
1.28	Provide neighbourhood leaf shredders in fall	√		Assists in composting of leaf wastes. Contributes to diversion of 0.2 to 1.4% of residential waste stream (2-11% leaf and yard waste, 25% of which is leaf waste. Assume 50% of this fraction).
2.5	Collection of all dry recyclables in a 4-stream wet-dry system	√		Diversion impacts likely similar to 3-stream (around 60% of residential waste).
2.13	Curbside collection of household organics in a 4-stream wet-dry collection system	√		Diversion impacts likely similar to 3-stream (around 60% of residential waste).
6.1	Centralized windrow composting of source separated organics	√		Alternative processing approach for source separated organics.
6.9	Use centralized anaerobic digesters	√		Alternative processing approach for source separated organics. Could contribute to diversion of some household and IC&I organics wet wastes, which make up 30% of residential waste and 9% of the IC&I waste stream.
8.5	Use state of the art technologies and techniques		√	Important design approach. Impact on diversion will depend on technique or technology being applied.
10.1	No unprocessed waste to landfill	√		Diversion should increase to over 70% for both residential and IC&I waste (see Chapter 8).

Component #	Component Description	Immediate	Long Term	Comments
10.2	Mandatory source separation by residential sector	√		Residential diversion should increase by 20%. (Halton experience).
10.5	Require municipalities in GTA to achieve designated diversion targets	√		Diversion would likely increase.
10.6	Require municipalities in GTA to establish effective waste generation and diversion monitoring systems.	√		Information could encourage design for increased diversion.
11.4	Allow residences to refuse delivery of unwanted "junk mail".	√		Can reduce residential waste by 1.6 to 2.3% assuming reduction of 50%, and generation rate of 15 kg/cap/year.
11.5	Reject loads with visible designated materials.	√		Should encourage increased source separation and diversion.
11.6	Develop landfill management practices which utilize disposed waste as cover material.	√		Increases landfill life, all material put to beneficial use could save a proportion of the 20% of landfill capacity typically occupied by cover material.
11.7	Produce compost on-site for landfill cover and preserve capacity.	√		Can divert quantities similar to central composting and preserve landfill capacity.
11.8	Volume based disposal fees.	√		Provides incentive to decreased disposal. Impacts depend on fees chosen.
13.3	Grant programs to support source reduction in residential sector.	√		Difficult to measure diversion impacts of this type of program; impacts assumed to be positive.
13.4	Full cost accounting forcing municipalities to charge the full or total cost of waste management.	√		May provide increased incentive to divert waste, if true costs of disposal are charged. Disposal costs of $80 to $90/tonne charged in GTA are likely close to full cost, therefore the effect of this policy may be minimal.
14.1	Integrate waste diversion with economic development programs to create markets for secondary materials.	√		Development of local markets beneficial, by creating stable demand. Difficult to measure diversion impacts of this type of program; impacts assumed to be positive.
14.2	Mandate product stewardship with requirement for market development.	√		Could result in recovery of 80% of packaging (15% of residential waste), some of which is currently diverted.
15.1	Expand Blue Box system to cover all IC&I facilities who want to participate, with focus on institutional and commercial.	√		Should increase diversion by providing convenient opportunity for IC&I sector to recycle.
15.2	Provision of bins at major IC&I facilities (e.g. hospitals, schools, shopping malls, etc.)	√		Would increase diversion by providing additional opportunities to recycle.

Component #	Component Description	Immediate	Long Term	Comments
15.8	Short term (3 to 6 month) storage of IC&I dry materials to take advantage of emerging technologies and/or market prices.	√		Contributes to diversion by providing protection against short term market problems. Impacts depend on materials involved.
16.5	Use centralized anaerobic digesters.	√		Alternative processing approach for source separate organics. Can contribute to diversion of 30% of residential waste and 9% of IC&I waste which is organic.
19.5	Replace collection and processing equipment and approach with state-of-the-art technology world wide (from Japan, Germany, etc.) (same as 8.5)	√		Important design approach. Impact on diversion will depend on technique or technology being applied.
20.5	Require retailers and/or producers to establish recovery systems for designated products and packaging.	√		Similar to Green Dot approach. Would contribute to diversion of 25% of residential waste.
20.6	Deposit/refund system for soft drink containers.	√		Ensures high recovery, diversion of materials involved. If applied to beverage containers (2% of the residential waste stream) incremental diversion would be 0.4% of residential waste stream.
20.8	Mandatory recovery rates and targets for specific materials.	√		Increases waste diversion. Rate depends on material.
20.16	Mandated levies or taxes to support 3Rs.	√		Provides source of funds to support 3Rs and therefore contributes to diversion. Impacts on waste diversion can be quantified when details of system scoped out.
20.17	Pass legislation against over-packaging.		√	Packaging component of residential waste (25%) would be reduced to some extent (not quantifiable at this stage).
21.1	Change approval process to require new IC&I facilities to design for reduction and re-use and submit a plan outlining these efforts prior to obtaining approval.	√		Will have waste diversion impacts in longer term (impacts can not be quantified until details of policy scoped out).
21.2	Establishment of central food waste management organization to help food retailers to send excess food to food banks, or to animal feed if human consumption is viable.		√	Can contribute to diversion of some 7% of IC&I waste stream which is food waste. Some portion of this could be diverted for human and animal consumption (% of food waste stream suitable for this purpose is not known).
21.3	Allow locations to refuse delivery of unwanted "junk mail".		√	Would increase diversion. Percentage of IC&I waste which is junk mail is not known.

Component #	Component Description	Immediate	Long Term	Comments
21.4	Develop and implement a material use guideline.	√		May strengthen markets/uses for waste materials.
22.4	Establish databank on waste reduction technologies and system design.	√		Will benefit waste diversion by providing easy access to information. Direct impacts on waste diversion can not be quantified.
23.4	Self-imposed levies by producers to promote 3Rs.	√		Similar impacts to German Green Dot program.
24.1	Funding and incentives to recycling industries and other industries that utilize secondary materials.	√		Would stabilize markets for secondary materials, contributing to sustainability of 3Rs systems.
24.2	Funding incentives to product manufacturers to utilize secondary materials.		√	Would stabilize markets for secondary materials, contributing to sustainability of 3Rs systems.
24.6	Purchasing specifications to promote recycled content.		√	Would stabilize markets for secondary materials, contributing to sustainability of 3Rs systems. Direct impacts on waste diversion can not be quantified.

A detailed description of the six residential waste diversion systems analyzed is presented below.

It should also be noted that there is currently a discrepancy in the Existing/Committed systems which were evaluated in the GTA 3Rs Analysis. The Municipal Finance, Natural Environment and Social Environment Criteria Groups based their evaluations on the Existing/Committed systems defined as of December 31, 1992 as stated in the Municipal Capital Budgets. The Cost and Service Criteria Groups recognized a "modified" Existing/Committed system based on information obtained through meeting with municipal representatives in June 1992. This discrepancy will be resolved during data verification with municipalities.

Residential System 1 - Existing

The Existing residential waste diversion system in each Region consists of a combination of components.

All Regions provide curbside recycling collection of Blue Box materials to most of their single-family residents. The range of materials varies from the basic list of materials (ONP, glass, tinplate steel, aluminum and PET), to an expanded list including some or all of the following materials: OCC, telephone books, magazines, textiles, plastics, etc. Some opportunities are provided to multi-family residents to recycle, either through provision of containers in multi-family buildings, or the provision of depots at convenient locations.

All collected materials are processed in a series of MRFs which can be owned by either the Region or a private contractor. Operation of the MRF can be either by municipal forces, or by contract to the Region.

Separate leaf and yard waste collection is generally provided on a seasonal basis, and these materials are composted at a series of open windrow composting sites throughout the GTA.

All Regions have aggressively promoted backyard composters as an economical means of waste diversion. These units are generally provided to householders at subsidized prices, and can be either picked up at Regional facilities, or delivered at an extra charge. Some Regions are exploring appropriate approaches to composting for multi-family residents, but this effort has not progressed significantly to date.

Additional waste diversion efforts include collection of Christmas trees, and bulky goods such as white goods either curbside or through drop-off depots.

Extensive promotion/education efforts have been on-going for some time, to improve participation in Blue Box and other recycling efforts, and also to encourage reuse and waste reduction as much as possible.

Existing residential waste diversion efforts diverted between 19% and 28% of the residential waste stream in all GTA Regions except Halton in 1992. Halton achieved an estimated 35% diversion of residential waste in 1992.

Residential System 2 - Existing/Committed

The Existing/Committed system includes any commitments in the five year capital budgets of GTA Regions. The Existing/Committed system varies from one Region to another. Some Regions have committed significant capital to waste diversion activities, whereas other Regions have stated that they do not intend to increase their recycling services.

Capital funds have been committed for the following activities by GTA Regions in their five year forecasts to the end of 1997:

- central composting facilities in some Regions, such as Peel, Halton and Metro;
- construction of a number of community recycling centres and depots;
- construction of new MRFs, or the expansion of existing MRFs to provide additional processing capacity;
- distribution of additional backyard composters;
- provision of recycling service to some additional multi-family units.

The Existing/Committed system for GTA Regions also includes any policy commitments made by the end of 1992. These include:

- the 3Rs regulations, the text of which was released in draft form in April 1993;
- NAPP, which is a voluntary program committed to by packaging users across Canada;
- the potential for implementation of a product stewardship model.

All GTA Regions meet the requirements of the proposed 3Rs regulations, which require that municipalities of greater than 5,000 population provide recycling services to at least half the frequency of the garbage collection. Municipalities of greater than 50,000 must provide reasonably convenient opportunities for collection of leaf and yard waste. This already occurs in the GTA where a number of municipalities offer separated curbside collection of leaf and yard

waste. The requirements of the regulations can be met by provision of drop-off depots for leaf and yard waste..

The proposed 3Rs regulations require owners of buildings containing 6 or more multi-family units to provide recycling services. This will increase recycling efforts by multi-family residents. The extent of this increase cannot be quantified at this time for a number of reasons. Firstly, the number of multi-family units in each GTA Region which are subject to the regulation is not known. Secondly, the extent to which these multi-family units are currently provided with recycling services is not known accurately. Therefore the impacts of the regulations on incremental diversion by multi-family units can not be quantified.

Residential System 3 - Direct Cost

In a Direct Cost system, waste generators pay for waste collection on the basis of the amount of waste generated. Most commonly, the rate structure increases with increased quantities of garbage collected. Direct Cost is current practice for most IC&I wastes, and can be applied to the residential sector through pay-by-the-bag, selected level of service, number of garbage cans, etc.

The advantages of a Direct Cost system include:

- it creates an economic incentive for waste reduction;
- municipal solid waste management costs decrease, because of the lower quantities of garbage sent for disposal;
- public understanding of solid waste management costs improves;
- residents realize cost avoidance through waste reduction;
- residents pay in proportion to the wastes generated.

The disadvantages of a Direct Cost system are as follows:

- it may be initially be received negatively by the public;
- it may discriminate against low income households;

- it requires complex administration and can often be expensive to implement and operate;

- it may lead to illegal dumping and burning;

- it may be difficult to control some of the problem elements (such as over-stuffed and heavy bags/containers).

The Direct Cost system would build on the Existing/Committed residential waste diversion system. Residents would pay for garbage disposal in a pay-by-the-bag system. Blue Box collection of dry materials and seasonal collection and composting of leaf and yard waste would continue at current levels of service, and would be provided free of charge, to promote maximum source separation and waste diversion.

Backyard composting would be aggressively promoted, by door-to-door sales of units. It has been assumed that up to 80% uptake of backyard composters by single-family households, and 40% uptake by "other" households (including townhouses, duplexes, low-rises, etc.) would be possible through door-to-door promotion. Composting by multi-family residents would also be encouraged, through promotion of community composting and vermi-composting.

For the preliminary GTA analysis, it was assumed that a simple pay by the bag (or tag) system would be implemented at a cost of $0.25 to $1.00 per bag/tag. The system would be supplemented with a strong promotion/education campaign to encourage the 3Rs, and explain the benefits and fairness of a Direct Cost system.

Residential System 4 - Expanded Blue Box

An Expanded Blue Box system is essentially Blue Box recycling with an expanded variety of dry recyclable materials. It attempts to achieve maximum diversion of dry recyclable materials using existing or modified facilities, and systems currently available to the Regions.
This system would include extensive promotion of backyard composting, to allow residents the opportunity to divert organics from disposal. Separate collection of leaf and yard wastes would also contribute to diversion of organics. An extensive promotion/education campaign would also be required, to ensure that householders understand what materials are involved in the expanded program. Some existing municipal MRFs would likely require modifications and expansion to handle the larger quantities of materials collected by the Expanded Blue Box system.

This system is based on the Blue Box 2000 project in Quinte. It is different from Wet/Dry approach (residential System 5) in that it does not depend on central composting of household wet wastes as a component of the system.

The dry materials that would be collected in this system would include:

- newspaper (ONP);
- corrugated cardboard (OCC);
- boxboard;
- polycoat (e.g. milk cartons);
- phone books;
- magazines and catalogues (OMG);
- mixed household paper;
- steel cans;
- aluminum cans;
- aluminum trays and foil;
- clear and coloured glass;
- PET;
- rigid plastic bottles & tubes (HDPE, PVC, PP, LDPE);
- film plastic (LDPE);
- foam plastic and rigid trays (PS);
- textiles.

Residential System 5 - Wet/Dry System

The term "Wet/Dry" is commonly used to refer to a type of solid waste collection program where the householder is required to separate their waste into 2 distinct streams - the wet or the organic fraction, and the dry, which consists of fibres, plastic, metals, etc. Each stream is stored separately in a container (typically a plastic bag or bin) which, in the case of single-family residents, is then taken out to the curb for collection. In a two stream system such as the one being implemented in the City of Guelph, all waste is placed into either the wet stream or the dry stream. No garbage option is provided. Most GTA Regions favour the three stream approach, hence this was the approach used for preliminary waste diversion estimates.

Implementation of a comprehensive three stream Wet/Dry system in GTA Regions would require all householders to separate their waste into three streams: wet waste, dry recyclables and garbage. Carts would likely be provided to all single-family households for the collection and storage of the wet and dry waste streams. If carts are supplied, new collection vehicles would be required, which are designed to service the carts. Larger (or expanded existing) MRFs would

be required to process the larger source separated dry stream. Central composting facilities would be required for processing of wet waste.

The viability of implementing successful Wet/Dry collection of waste from multi-family units in GTA is somewhat uncertain at this stage, as the garbage management system in most older buildings is typically based on a single-chute system. Many buildings provide an option for recycling of dry materials to residents, by providing bins on the ground floor, or in the basement of the building, where source separated recyclables can be deposited. A similar approach would likely be necessary for three stream Wet/Dry collection, where an additional bin would be provided for voluntary separation of food waste. This would likely be delivered in sealed bags by residents.

Backyard composting would continue to be promoted, and leaf and yard waste would continue to be collected separately during the growing season. This system would also require extensive promotion/education, as it requires a significant change in habits for the householder. Wet-dry systems have worked successfully in Europe for years, and have been tried on a pilot scale in Ontario.

Residential System 6 - Mixed Waste Processing of "Third Bag" System

Mixed Solid Waste (MSW) processing involves collecting unseparated waste and taking it all to a Mixed Waste Processing facility. The recyclable fractions are removed, processed and marketed, where feasible, and the organic materials are composted. The residue is sent to landfill. Some facilities focus primarily on composting, while others focus on incineration.

Two approaches to Mixed Waste Processing could be considered in GTA Regions. These are:

1. Completely replace the existing waste management system with a Mixed Waste Processing system. In this case, all current waste diversion programs (such as Blue Box, leaf and yard waste collection, etc.) would be cancelled, and all garbage would be collected at the curb and sent to the mixed waste plant for processing.

2. Mixed Waste Processing could be used to process garbage currently collected at the curb, after Blue Box recycling, separate collection of leaf and yard waste and backyard composting of household organics has occurred.

Complete replacement of the existing waste management system with a mixed waste management system (eliminating all current source separation programs) is considered not to be viable in the GTA for the following reasons:

1. It contradicts provincial source separation policy: The mixed waste approach conflicts with the 3Rs focus of existing waste management policy and practice. It would negate gains that have been made through education and divert attention from reduction and reuse efforts. The full mixed waste strategy promotes an "out-of-sight, out-of-mind" attitude that would negate advances in waste reduction achieved during the last few years.

2. It erodes the current infrastructure: A mixed waste approach would require dismantling the current recycling infrastructure, which has been developed over several years. This is considered a costly step backwards.

3. It produces low quality recyclables: The quality of recyclables diverted through source separation programs will always be higher than those which are mixed with other wastes, particularly wet organics. A greater percentage of this material is likely to be discarded as unfit for sale to secondary markets.

4. It creates disincentives to waste diversion. Mixed waste facilities are expensive to site and operate, therefore municipalities are often required to commit to provide a set amount of garbage or pay a penalty. These "put or pay" contracts eliminate incentives for communities to encourage waste reduction, contrary to the present policy in Ontario.

5. Finished compost quality may be poor: Finished compost from mixed waste plants is often contaminated with materials such as glass, plastic, household hazardous waste, etc. This contamination is difficult and expensive to manage in a mixed waste system. Compost quality is better controlled in a waste management system that includes source separation.

A full mixed waste system was ruled out for GTA on the basis that it does not meet existing policy which focuses on source separation. Mixed Waste Processing and composting is considered as a potential "add-on" to the Existing/Committed system, for processing of the "third bags", of garbage which remains after recyclables and leaf and yard wastes have been diverted in separate collections, and which would otherwise go to landfill. The system would involve some additional separation of recyclables at the Mixed Waste Processing plant, and mixed waste composting of the remaining stream.

In the 3Rs systems evaluations, two Mixed Waste Processing scenarios were considered: 1) System 6A - low quality compost, and 2) System 6B - high quality compost. These two scenarios address the different ranges of compost quality and end-use possibilities.

7.7.2 Summary of Alternative Residential Waste Diversion Systems

To summarize, the alternative residential waste diversion systems analyzed are characterized as follows:

Residential System 1 - Existing - the "do nothing" alternative is based on the status quo, i.e. the residential waste diversion system which was in place in each GTA Regional municipality on 31 December, 1992;

Residential System 2 - Existing/Committed - policies announced by 31 December, 1992 (including 3Rs regulations) and waste diversion programs committed in 1992 Regional five-year budgets (to the end of 1997);

Residential System 3 - Direct Cost - a system built on the Existing/Committed system which includes a user fee (charged to the homeowner) for garbage collection;

Residential System 4 - Expanded Blue Box - a system where the range of dry recyclables collected at the curb are expanded and household organics (food and yard waste) is managed through backyard composters and separate collections of leaf and yard waste;

Residential System 5 - Wet/Dry - Household waste is collected in three streams including wet food and yard wastes, dry recyclables, and garbage, with central composting of wet wastes;

Residential System 6 - Mixed Waste Processing - a system which includes Blue Box collection of recyclables, separate collection of leaf and yard waste, backyard composting of some household wet wastes and processing of the remaining "third bag" of waste in a Mixed Waste Processing and composting plant.

7.8 Step 6: Developing Potential Alternative IC&I Waste Diversion Systems for the GTA

7.8.1 IC&I System Development

A set of six representative waste diversion systems was developed for the IC&I Sector from the short list of core and primary enhancement components. As with the Residential systems, a group of potential alternative systems was assembled as *combination of waste diversion components* which could be added to the Existing or Existing/Committed IC&I waste diversion systems to reduce the amount of waste which is currently disposed. The systems provided an analytical basis from which to examine the potential for different approaches to divert IC&I waste in GTA municipalities, but do not present a complete list of possible combinations of waste diversion system components to optimize diversion.

The Existing system was based on the system in place in the GTA at the end of 1992. It was adopted as the "do-nothing" alternative. Any policy and program commitments made for waste diversion, at all levels of government, and by the private sector were incorporated into the Existing/Committed system. This includes short term (e.g. 1993 - 1997) commitments which incorporate the impacts of the proposed Provincial 3Rs regulations and NAPP.

In addition to these two systems, four additional alternative systems were developed. Because waste management in the IC&I sector is predominantly conducted on a private basis, a regulatory approach which can cover all IC&I generators, is a comprehensive method by which diversion can be increased. For this reason, the IC&I systems are primarily policy-driven and focus on regulatory measures which could be implemented to increase the quantities of IC&I waste diverted.

Again, components which were identified as "core" in Table 7.2 were combined with those identified as "primary enhancement components". Together, these combined to form four alternative IC&I waste diversion systems, which were:

- an "Extended 3Rs Regulations" system;
- an "Expanded 3Rs Regulations" system;
- an "Expanded 3Rs Regulations with Organics" system; and
- a "Processing All IC&I Waste" system.

A detailed description of the six IC&I waste diversion systems analyzed is presented below:

IC&I System 1 - Existing

This system is based on the IC&I waste management system which was in place in GTA at the end of December 1992. At that time, waste diversion by the IC&I sector was carried out on a voluntary basis. Tipping fees at GTA landfills were $150/tonne for the private sector, causing significant export of waste to the US. A number of landfill bans throughout the GTA also limited the materials which could be disposed in landfills (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.).

Opportunities to recycle were provided to small IC&I generators through some municipally run depots. Two municipalities (Caledon and City of Toronto) provided some municipal collection of IC&I recyclables. Processing of some IC&I recyclables was also provided by some municipally-run MRFs.

Collection and processing of a wide range of source separated dry recyclables from the IC&I sector was provided by many private sector haulers and recyclers, some of which owned and operated processing facilities.

Collection and processing of wet wastes generated by the IC&I sector was provided by the private sector (e.g. centralized windrow composting - Scotts Farm, rendering of food wastes, collection by farmers for landspreading and animal feed, etc.). In addition, redistribution of food wastes from the IC&I sector was carried out through organizations such as Second Harvest and food banks.

Various facilities provided exchange services (e.g. Ontario Waste Exchange, local waste exchange program in Durham, WASTEWISE, Halton, etc.)

Voluntary waste reduction initiatives were pursued by individual IC&I establishments. These include implementation of source separation and recycling programs, carrying out waste audits, and developing waste reduction action plans, which included reduction, reuse and recycling elements.

The National Packaging Protocol (NAPP), a federal initiative, required that packaging waste generation be reduced by 50% by the year 2000, measured against a 1988 baseline. NAPP is a voluntary program at this time. Private sector companies were complying with the spirit of NAPP on a voluntary basis as of the end of 1992.

IC&I System 2 - Existing/Committed

The Existing/Committed system includes the Existing system described above, and also the estimated impacts of any policy commitments announced at the local, Regional, provincial and federal level by the end of 1992. These include the Ontario 3Rs regulations, and the National Packaging Protocol (NAPP).

The draft text of the Ontario 3Rs regulations was released in April, 1993. It was anticipated that the Ontario 3Rs regulations would be promulgated under the Waste Management Act in August of 1993, however, this schedule has been delayed. There are three requirements under the Ontario 3Rs regulations. Designated major generators must:

- implement source separation programs;
- carry out waste audits and develop waste reduction action plans; and
- some manufacturing facilities and large importers must carry out packaging audits and develop packaging reduction action plans.

GTA IC&I facilities affected will have 6 to 12 months from the date of promulgation of the 3Rs regulations in which to comply.

Designated Major Waste Generators

The 3Rs regulations will apply only to those IC&I establishments which are designated major waste generators. These include:

- retail shopping establishments with a floor area of at least 10,000 sq. m.;
- retail shopping complexes with a floor area of at least 10,000 sq. m.;
- construction projects with a total floor area of at least 2,000 sq. m.;
- demolition projects with a total floor area of at least 2,000 sq. m.;
- office buildings with a total floor area of at least 10,000 sq. m.;
- multi-family complexes containing 6 or more units;
- restaurants with 10 or more employees;
- hotels and motels which have 75 units or more;
- hospitals classified as A, B, or F in Regulation 964;
- educational facilities with enrolment of 350 persons or greater;
- manufacturing facilities with 100 employees or more.

Source Separation Requirements

The regulations require that designated major generators of IC&I waste implement a source separation program covering a number of materials from the waste stream. Collection, handling and storage facilities must be provided for the materials specified. The generator must make reasonable efforts to ensure that source separated materials are reused or recycled.

The list of materials that is required to be separated varies among different sectors, and is as follows:

Retail, office buildings, hospitals, educational aluminum food and beverage cans corrugated cardboard fine paper glass bottles and jars for food and beverages newsprint steel food and beverage cans	***Restaurants, hotels and motels*** aluminum food and beverage cans corrugated cardboard fine paper glass bottles and jars for food and beverages newsprint steel food and beverage cans PET
Multi-unit residential: aluminum food and beverage cans glass bottles and jars for food and beverages newsprint steel food and beverage cans PET other materials collected by local Blue Box program	***Large manufacturing*** aluminum corrugated cardboard fine paper glass newsprint steel PET HDPE, (jugs, crates, pails, totes and drums) LDPE film polystyrene foam polystyrene trays, reels and spools wood
Construction brick corrugate cardboard concrete drywall steel wood	***Demolition*** brick concrete steel wood

Waste Audits and Waste Reduction Work Plans

The designated major generators must also carry out waste audits and develop waste reduction action plans. These must be updated on a yearly basis, and be communicated to employees.

Packaging Audits and Packaging Reduction Work Plans

Under the regulations, large manufacturers of food, beverages, paper and chemical products (in SIC 10, 11, 27, and 37) with greater than 100 employees, and importers of these products with annual sales in excess of $20 million must carry out packaging audits and develop packaging reduction work plans. These must be done at least every two years. They must be summarized and communicated to employees.

Discussions with haulers and recyclers suggest that the existing infrastructure in GTA will be able to handle the increased quantities of source separated materials requiring collection and processing under the requirements of the 3Rs regulations. Private sector haulers and recyclers are expected to be able to provide the increased services required. Existing processing capacity can likely handle the increased flow of materials, hence no new processing facilities are likely to be required.

IC&I System 3 - Extended 3Rs Regulations

This system would build on System 2, but would require a change in policy to extend the proposed 3Rs regulations to include a significantly larger number of IC&I waste generators. In this system the proposed 3Rs regulations would be extended as follows:

- the waste related requirements of the 3Rs regulations (on source separation of (OCC, ONP, fine paper, glass, ferrous and non-ferrous metals), and also on mandatory waste auditing and waste reduction planning) would be extended to cover all IC&I generators who account for 90% of the IC&I waste generated in Ontario (or the GTA);

- IC&I generators who account for 90% of the IC&I waste generated within the manufacturing, retail and wholesale sectors in Ontario (or the GTA) would be required to source separate an expanded list of materials (required only of major manufacturers in the current 3Rs regulations). The expanded list would include: aluminum, OCC, fine paper, glass ONP, steel, PET, HDPE, LDPE film,

polystyrene and wood. Mandatory waste auditing and waste reduction planning would also be required of these generators;

- the proposed requirements for source separation (of brick, OCC, concrete, drywall, steel and wood), and waste reduction action plan development would also extend to a much larger number of construction/demolition projects. Again, the cut off criterion would be chosen so that 90% of generated C&D waste would be subject to the regulations. It is estimated that these requirements would result in many smaller construction and demolition contractors having to comply with the regulations on smaller construction and demolition projects;

- in addition, food service and accommodation establishments would also be required to source separate PET;

- the packaging provisions in the 3Rs regulations would remain unchanged, and would apply only to major generators (>100 employees) in the SICs currently involved. (SIC 10, 11, 27 and 37) and importers of these products (with annual sales in excess of $20 million).

It has been assumed that 60-70% of IC&I generators likely account for 90% of IC&I waste generated in Ontario. Choosing the 90% cut-off for extension of the regulations is estimated to relieve many small IC&I generators of the requirements of the extended regulations. If 100% of all IC&I generators were required to comply with the extended regulations, it would require significant effort on the part of many very small IC&I establishments, with marginal benefit in terms of increased waste diversion. Capturing 90% of the waste stream under the extended regulations is considered a more appropriate approach. This is similar to the municipal 3Rs regulations, where requiring communities with populations over 5000 to source separate provided recycling services to 90% of Ontario's population.

Each of the IC&I generators impacted by the Extended 3Rs regulations would be required to institute source separation programs in their facilities. This would likely require the purchase of a number of recycling bins by each IC&I generator, for placement at strategic locations throughout the facility. Design of a recycling system for the facility, and development of a training program for facility staff, in order that they understand which materials go into which bins, would also be required.

The extent to which materials would be source separated in the IC&I facility would depend on the hauler, or recycler which services the IC&I facility. Some companies require separation into a number of different streams (e.g. glass, metal, plastic, fine paper, OCC, etc.) whereas other hauling/recycling companies use a two bin system.

Because the total processing capacity of the existing private sector recycling system is not known (private sector companies contacted during this study were reluctant to divulge this information), it is unknown what expansions would be necessary to provide the additional capacity required. Also, the existing capacity of the private sector to provide recycling services is not known accurately, therefore the level of expansion of collection services necessary to meet the requirements of the Extended 3Rs regulations can not be accurately estimated. The private sector would likely respond to provide the additional services and processing capacity required under this system, and always indicate their willingness and desire to do so. On this basis it is reasonable to assume that adequate capacity for source separated material collection and processing will be available in GTA.

An aggressive market development policy would be required to ensure that stable markets were created for the larger quantities of dry recyclables which would enter the secondary materials markets under this system. Market development policies which could be considered include: mandatory recycled content for a number of products (particularly packaging), mandatory purchasing specification development at all levels of government to create incentives for secondary material market development, support of green industries using secondary materials as feedstock, etc.

IC&I System 4 - Expanded 3Rs Regulations Regulations

This system would build on System 3 (Extended 3Rs Regulations), and would require the source separation of a larger range of dry materials. System 4 would apply to IC&I generators who contribute to generation of 90% of the GTA (or Ontario) waste stream (the same group as for System 3) who would also be subject to the Expanded 3Rs Regulations. Identification of generators which would be involved was not carried out as part of this study, but it would likely apply to 60 to 70% of GTA generators. The Extended 3Rs Regulations system would require that the generators impacted source separate the following materials: aluminum, OCC, fine paper, glass, newsprint, steel, PET, HDPE, LDPE film, polystyrene, wood, and other paper products (which include boxboard and mixed papers).

The existing 3Rs infrastructure would likely require some expansion to handle the new materials which would be recycled under this system. Some new facilities (MRFs to handle a wide array of dry recyclables) and additional collection capacity (for dry recyclables) would be required. The additional plastics recovered in this system will require initiatives to encourage the development of cost effective separation and processing technologies.

This system would also require aggressive market development policies and actions to ensure that stable markets are created for the larger quantities of dry recyclables which would enter the secondary materials markets.

IC&I System 5 - Expanded 3Rs Regulations with Organics

This system would build on System 4 (Expanded 3Rs Regulations), and would include wet wastes, or organics (7-8% of the GTA IC&I waste stream) in the regulated list of materials requiring source separation by the IC&I sector. Because most IC&I food wastes are generated by a few IC&I sectors (most notably food manufacturers, grocery stores, restaurants, hotels, hospitals, schools, etc.) the regulations would be structured to capture 90% of the IC&I organic waste stream, by targeting a few sectors. In addition, significant IC&I generators of yard waste (landscapers, garden maintenance companies, etc.) would be required to source separate and divert these streams from disposal.

Many IC&I food waste generators would have to implement source separation programs for food wastes. New recycling bins would have to be purchased and located strategically in kitchen and food preparation areas. Staff would be trained to put food waste into designated separate bins.

In many cases, a separate company (to the hauler/recycler used for dry recyclables) may handle the source separated organics, which will require frequent removal from the property, because of potential odour generation. Where feasible, efforts may be made to compost the source separated food wastes on site.

Options for food waste diversion include use as human food, animal feed, landspreading, rendering and composting. The use of food banks and organizations such as Second Harvest would likely increase, depending on any health department restrictions involved. Existing landspreading and animal feed capacity within a reasonable distance of GTA are fixed, and are not easily expanded. Rendering capacity can be expanded considerably, but may not be cost competitive with other management options. Existing composting capacity may be adequate, (depending on what proportion of the source separated waste was composted and whether some private sector facilities in the planning stages at this time will be constructed).

Source separation and diversion of organic (predominantly green) wastes by IC&I generators such as landscapers and garden maintenance companies is likely easier, as most of their waste is relatively homogeneous. Options in this case would be limited to direct land application or composting.

IC&I System 6 - Processing All IC&I Waste

This system would build on the Existing/Committed IC&I system, including the requirements of the 3Rs regulations and would require that all IC&I waste be processed prior to landfilling. New legislation mandating this requirement would be necessary, or the same result would be achieved if this requirement were included in the Certificate of Approval for GTA landfills.

There are a number of ways in which this system could and probably would operate. Major generators subject to the 3Rs regulations would implement source separation programs. For wastes from other generators, haulers/recyclers would have the option of either requiring some level of source separation by their facility accounts, or picking up only one bin of mixed waste (garbage). The applicability of each approach might depend on the size of the account and the overall economics of extensive material separation versus disposing of all waste into one bin.

The level of processing carried out would depend on the wording of the regulations, and the economics of additional processing versus minimal processing and subsequent disposal from the haulers/recycler's point of view.

High processing and disposal costs might encourage increased source separation and negotiation of separate contracts for different materials on economic grounds. There are examples of this approach in the Existing system, where companies source separate OCC and negotiate for its separate collection by brokers. Also, some food service facilities allow farmers to haul away source separated food wastes at zero or minimal costs.

A variety of methods would be used to meet the requirements of this system. The combinations would include some source separation, and some processing of mixed waste. It would likely require additional processing facilities in the GTA for both source separated and mixed IC&I wastes (including specialized facilities for C&D waste).

The costs of waste management would increase, particularly for companies who opt for disposing of mixed waste without any source separation.

7.8.2 Summary of IC&I Waste Diversion Programs

To summarize, the alternative residential waste diversion systems analyzed are characterized as follows:

IC&I System 1 - Existing - the "do nothing" alternative is based on the IC&I waste diversion system that was in place in GTA as of 31 December, 1992.

IC&I System 2 - Existing/Committed - policies announced as of 31 December, 1992, including 3Rs regulations which require that designated sectors conduct waste audits, packaging audits, develop waste and packaging reduction plans and implement source separation programs for specified materials and the National Packaging Protocol (NAPP).

IC&I System 3 - Extended 3Rs Regulations - a system built on System 2 that applies 3Rs regulations to a much greater number of IC&I generators.

IC&I System 4 - Expanded 3Rs Regulations - a system that builds on System 3, and mandates source separation of a wider range of dry materials by the same group and number of IC&I generators identified in System 3.

IC&I System 5 - Expanded 3Rs Regulations with Organics - a system that builds on System 4, and requires designated IC&I generators to source separate and divert wet wastes (food waste, leaf and yard wastes).

IC&I System 6 - Processing All IC&I Waste - a system that builds on System 2 and would require that all material disposed as waste be processed (through any legitimate means) prior to landfilling.

7.9 Components of Residential and IC&I Waste Diversion Systems

7.9.1 Residential System Components

Six residential systems were developed and described for the Regions of Durham, Peel, Metro Toronto and York. The components of these systems are summarized for each of the for Regions as follows:

- Existing – Table 7.4;
- Existing/Committed – Table 7.5;
- Direct Cost – Table 7.6;
- Expanded Blue Box – Table 7.7;
- Wet/Dry – Table 7.8;
- Mixed Waste Processing – Table 7.9.

The components of the Existing and Existing/Committed system for Halton are also included in Tables 7.4 and 7.5

7.9.2 IC&I System Components

The IC&I systems were considered to apply to GTA as one unit, and were not addressed separately for GTA Regions. The components of each IC&I are summarized in Table 7.10.

TABLE 7.4
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING

Generic Components Existing Within the GTA	REGIONS				
	Durham	**Metro Toronto**	**York**	**Peel**	**Halton**
Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings · Collection of residential garbage from multi-family units · Self-haul of garbage	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwelling by contractors to municipalities on weekly basis · Collection of residential garbage from multi-family units by private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors
Residential Recycling and Collection · Curbside collection of Blue Box materials · Expanding curbside collection · Collection of bins of recyclables from multi-family units · Drop-off depot for multi-family dwellings not serviced by recycling · Drop-off depot for rural households	Residential Recycling and Collection · Curbside collection of Blue Box materials bi-weekly, from single family dwellings. Materials include: ONP, telephone directories, OCC, PET, HDPE, glass, ferrous, aluminum · Collection of bins of recyclables from multi-family units · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depot for rural households	Residential Recycling and Collection · Curbside collection of Blue Box materials from single family dwellings and some apartment buildings. Typical materials include: ONP, OCC, telephone directories, magazines, PET, HDPE, glass, ferrous, aluminum · Collection of bins of recyclables from multi-family units · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depots for rural households	Residential Recycling and Collection · Region is only municipality within GTA not co-ordinating recycling programs of member municipalities · All municipalities except Whitchurch-Stouffville and King Township receive weekly curbside collection of recyclables on same day as garbage collection; bi-weekly collection of recyclables in Whitchurch-Stouffville; King Township collects on a different day from regular garbage · Materials collected by different municipalities include: ONP, glass, steel, aluminum, PET, OCC, telephone directories, HDPE, rigid and other plastics	Residential Recycling and Collection · Curbside collection of Blue Box materials from single family dwellings and some apartment buildings. Typical materials include at least: ONP, PET, glass, ferrous, aluminum (Caledon), these and telephone directories in Brampton · Expanded curbside collection (Mississauga) to collect additional materials (HDPE, mixed plastic, textiles, OMG, OCC) · Collection of bins of recyclables from multi-family units · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depots for rural households	Residential Recycling and Collection · Recycling is mandatory in Halton. All households in the Region are served by curbside program, including rural homes and multi-family buildings. Region claims 100% participation, either through curbside pick-up and depot service · Pick-up contracted to Laidlaw and occurs once every two weeks · Materials include: ONP, OCC, telephone directories, PET, HDPE, glass, steel, aluminum, aluminum foil, polystyrene foam, boxboard and fine paper · Region operates one drop-off depot at new landfill site

TABLE 7.4
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING
(continued)

Generic Components Existing Within the GTA	REGIONS				
	Durham	Metro Toronto	York	Peel	Halton
Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste	Residential Leaf and Yard Waste Collection · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste (depots located at transfer station and other convenient sites)	Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste	Residential Leaf and Yard Waste Collection · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste at Regions composting site; no charge to residents	Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste	Residential Leaf and Yard Waste Collection · Curbside collection of lead and yard waste · Currently handled at local municipal level. Leaf and yard waste collected at Region's transfer stations delivered to Scott's Farms in Milton
Residential Household Composting · Backyard composter distribution programs · Large 3-bin composting units distributed to apartment and co-operative housing complexes · Community composting	Residential Household Composting · Backyard composter distribution programs (22,553 composters by end of 1992)	Residential Household Composting · Backyard composter distribution programs (105,000 units to date) · Sale of 3-bin units to some multi-family dwellings at $150 each (25 units by end of 1992)	Residential Household Composting · Backyard composter distribution programs (23,000 composters by end of 1992)	Residential Household Composting · Backyard composter distribution programs (56,839 units to date)	Residential Household Composting · Backyard composter distribution programs (21,300 units by end of '92)
Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Special and weekly curbside collections of white goods · Drop-off depots for white goods · Special curbside collection for bulky items · Permanent drop-off depot for household hazardous waste (HHW) · Special household hazardous waste drop-off days · Toxic Taxi service · Mobile HHW depots	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Permanent drop-off depots for HHW at Brock West landfill, Scugog and Oshawa transfer stations · Toxic taxi service (discontinued in fall 1992)	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Curbside collection of white goods (East York, Etobicoke, York) · Drop-off depots for white goods (Etobicoke) · Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill) · Two toxic taxis	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collection of Christmas trees · Curbside collection of white goods in all municipalities - frequency varies · Richmond Hill now reclaims CFC and compressor oil and sends units for shredding and recycling · Some municipalities conduct HHW collection days · Richmond Hill operates mobile HHW depot; Region of York also ran successful pilot mobile HHW depot in 1992	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collection of Christmas trees · Special and weekly (e.g. Mississauga, Brampton) curbside collections of white goods · Drop-off depots for white goods (Brampton, Caledon) · Once a year HHW collection at Bolton Community Centre · Permanent drop-off depot for HHW at the Britannia Road landfill · Mixing of leaves with topsoil (Mississauga, 1992)	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Both curbside and drop-off services for white goods · Two permanent HHW depots

TABLE 7.4
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING
(continued)

Generic Components Existing Within the GTA	REGIONS				
	Durham	Metro Toronto	York	Peel	Halton
Composting Facilities · Centralized windrow composting of leaf and yard waste · In-vessel composting of source separated organics	Composting Facilities · Centralized windrow composting of leaf and yard waste	Composting Facilities · Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale site) · Centralized in-vessel composting facility at Dufferin Transfer Station, with capacity of 200 tonnes/day (operated by Metro)	Composting Facilities · Centralized windrow composting of leaf and yard waste operated by Miller Waste Systems	Composting Facilities · Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill)	Composting Facilities · Scotts Farms in Milton · 1.6 ha windrow facility in Oakville for leaf and yard waste · Other municipalities deliver leaf and yard waste to local farmers and landscaping companies and Milton collects pumpkins following Halloween and delivers them to a local pig farmer for animal feed
Reuse Centres and Activities · Municipal reuse centre · Private reuse centre · Non-profit reuse centre · Charitable reuse centres · Food reuse organization · Special goods exchange days	Reuse Centres and Activities · Goodwill trailers located throughout Region · Attended donation centre at Riston transfer station	Reuse Centres and Activities · Goods exchange days organized by East York · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest) · Re-Uze Centre in Scarborough	Reuse Centres and Activities · Goods exchange days in Richmond Hill	Reuse Centres and Activities · Municipal reuse centre (Caledon landfill scavenging centre, Albion and Brampton goods exchanges) · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest)	Reuse Centres and Activities · Wastewise in Halton Hills operates as community-based resource centre and diversion facility. Includes four different components: 1) education centre and information service 2) reuse centre accepting and selling household goods 3) repair centre repairing household appliances, power tools and equipment 4) recycling depot for materials not accepted by Blue Box, including: six grades of plastic, eight grades of paper, scrap metal, textiles, aggregate, egg cartons, rubber, film canisters, coat hangers, etc.

TABLE 7.4
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING
(continued)

Generic Components Existing Within the GTA	REGIONS				
	Durham	Metro Toronto	York	Peel	Halton
Public MRFs Processing centre for dry recyclables	Public MRFs · One processing centre (MRFs) for dry recyclables collected from the residential sector (and minor amounts from the commercial/ institutional). Owned by the municipality and operated by municipal staff	Public MRFs · QUNO MRF on Commissioners Street, which processed fibres and container materials under contract to Metro in 1992. Operation being changed in 1993 to process fibres only · CRinc MRF on Commissioners Street, which started operation in May 1992. It processes only container materials (plastic, metals and glass). The facility is owned by Metro, and is operated under contract by CRinc · Dufferin Street MRF is owned by Metro and operated by QUNO	Public MRFs · Markham MRF owned by Markham but operated by Miller Waste Systems. Currently operating on a temporary basis (will be replaced by new Regional facility that is being built). Processes ONP, container materials and other recyclables - 15,300 tonnes in 1992 · Richmond Hill MRF operated by Miller - 12,000 tonnes processed in 1992. It too will be replaced by planned Regional facility	Public MRFs · Mississauga processing centre (MRF) for dry recyclables collected form the residential (and minor amounts from the commercia/institutional) sector in Mississauga and Brampton. Owned by the Region of Peel and operated by Laidlaw · MRF/transfer station in Bolton for Caledon material	Public MRFs · Regional MRF, owned by Region and operated by Halton Recycled Resources Inc. under contract to the Region, processes Region's recyclables
Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables · Depots located at transfer stations/landfill	Residential Recycling Depots and Transfer Stations · Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) · Depots located at transfer stations to provide recycling opportunities to self-haul generators · Drop-off depot for white-goods (Lasco)	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables (including all banned materials) at landfills (confirm) · Depots located at transfer stations to provide recycling opportunities to self-haul generators (confirm) · Igloos and domes provide opportunities to recycle in public areas · Depots for voluntary recycling by residents (e.g. Scarborough)	Residential Recycling Depots and Transfer Stations · Markham operates a depot that accepts boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill · Depots located at transfer stations to provide recycling opportunities to self-haul generators	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables at new landfill

TABLE 7.4
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING
(continued)

Generic Components Existing Within the GTA	REGIONS				
	Durham	Metro Toronto	York	Peel	Halton
Residential Promotion and Education	Residential Promotion and Education	Residential Promotion and Education	Residential Promotion and Education	Residential Promotion and Education	Residential Promotion and Education
· 3Rs promotion and education program · Consumer education program	· 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · Promotional video on home composting	· Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages · Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto" · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc.	· Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities · Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers · Richmond Hill and Markham conducted extensive door-to-door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools	· 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc.	· Extensive promotion of backyard composting conducted on a municipal level. Promotion efforts include advertising, open houses and seminar hosted by RCO. Halton Hills currently conducting survey to determine community's interest in backyard composting

TABLE 7.5
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING/COMMITTED

Generic Components Existing Within the GTA	REGIONS				
	Durham	Metro Toronto	York	Peel	Halton
Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings · Collection of residential garbage from multi family units · Self haul of garbage · Regional recycling legislation	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipalities or contractors to municipalities · Collection of residential garbage from multi-family units by municipalities or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipalities or contractors to municipalities · Collection of residential garbage from multi-family units by municipalities or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwelling by contractors to municipalities on weekly basis · Collection of residential garbage from multi-family units by private contractors · Self-haul of garbage to landfills and transfer stations by rural residents · Newmarket is examining details for a Wet/Dry collection system for the whole Town, in conjunction with a planned private in-vessel composting facility that will be built in the Town	Garbage Collection and Disposal · Weekly curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipalities or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors
Residential Recycling and Collection · Curbside collection of Blue Box materials · Expanding curbside collection · Collection of bins of recyclables from multi family units · Drop-off depot for multi-family dwellings not serviced by recycling · Community recycling centres · Recycling at all multi-family buildings of 6 or more units · Blue Box recycling mandated · Engineered recycling depot · Drop-off depot for rural households	Residential Recycling and Collection · Curbside collection of Blue Box materials bi-weekly, from single family dwellings. Materials include: ONP, telephone directories, OCC, PET, HDPE, glass, ferrous, aluminum · Collection of bins of recyclables from multi-family units · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depot for rural households	Residential Recycling and Collection · Curbside collection of Blue Box materials from single family dwellings and some apartment buildings. Typical materials include: ONP, OCC, telephone directories, magazines, PET, HDPE, glass, ferrous, aluminum · Collection of bins of recyclables from multi-family units · Drop-off depots for multi-family dwellings not serviced by recycling	Residential Recycling and Collection · Region is only municipality within GTA not co-ordinating recycling programs of member municipalities · All municipalities except Whitchurch-Stouffville and King Township receive weekly curbside collection of recyclables on same day as garbage collection; bi-weekly collection of recyclables in Whitchurch-Stouffville; King Township collects on a different day from regular garbage · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)	Residential Recycling and Collection · Curbside collection of Blue Box materials from single family dwellings and some apartment buildings. Typical materials include at least: ONP, PET, glass, ferrous, aluminum (Caledon), these and telephone directories in Brampton · Expanded curbside collection (Mississauga) to collect additional materials (HDPE, mixed plastic, textiles, OMG, OCC) · Collection of bins of recyclables from multi-family units	Residential Recycling and Collection · Recycling is mandatory in Halton. All households in the Region are served by curbside program, including rural homes and multi-family buildings. Region claims 100% participation, either through curbside pick-up and depot service · Pick-up contracted to Laidlaw and occurs once every two weeks · Materials include: ONP, OCC, telephone directories, PET, HDPE, glass, steel, aluminum, aluminum foil, polystyrene foam, boxboard and fine paper
Residential Recycling and Collection - continued	· Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)	· Drop-off depots for rural households · Recycling to all apartments in buildings containing 6 or more units (3Rs Regulations) · Some additional recycling service to multi-family units · Some additional recycling at new depots	· Materials collected by different municipalities include: ONP, glass, steel, aluminum, PET, OCC, telephone directories, HDPE, rigid and other plastics	· Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depots for rural households · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)	· Region operates one drop-off depot at new landfill site · Addition of 24 new igloos to Igloo Program in 1993 · Purchase of new recycling vehicles - $255,000 allocated · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)

TABLE 7.5
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING/COMMITTED
(continued)

Generic Components Existing Within the GTA	REGIONS				
	Durham	**Metro Toronto**	**York**	**Peel**	**Halton**
<u>Residential Leaf and Yard Waste Collection</u> · Curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste	<u>Residential Leaf and Yard Waste Collection</u> · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste (depots located at transfer station and other convenient sites)	<u>Residential Leaf and Yard Waste Collection</u> · Curbside collection of leaf and yard waste	<u>Residential Leaf and Yard Waste Collection</u> · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste at Regions composting site; no charge to residents	<u>Residential Leaf and Yard Waste Collection</u> · Curbside collection of leaf and yard waste	<u>Residential Leaf and Yard Waste Collection</u> · Curbside collection of leaf and yard waste · Currently handled at local municipal level. Leaf and yard waste collected at Region's transfer stations delivered to Scott's Farms in Milton · Oakville has banned the collection of grass clippings · Burlington has proposed a ban on the collection of grass clippings similar to Oakville's
<u>Residential Household Composting</u> · Backyard composter distribution programs · Large 3 bin composting units distributed to apartment and co-operative housing complexes · Community composting	<u>Residential Household Composting</u> · Backyard composter distribution programs (22,553 composters by end of 1992) · Community composting	<u>Residential Household Composting</u> · Backyard composter distribution programs (105,000 units to date) · Sale of 3-bin units to some multi-family dwellings at $150 each (25 units by end of 1992) · Distribution of an additional 15,000 to 20,000 backyard composters, to bring the total distributed by Metro to 120,000 to 125,000 · Community composting	<u>Residential Household Composting</u> · Backyard composter distribution programs (23,000 composters by end of 1992) · Distribution of additional backyard composters by individual municipalities · Community composting	<u>Residential Household Composting</u> · Backyard composter distribution programs (56,839 units to date) · Backyard composters to be used in 68,839 single family households (58% of single family households), an addition of 12,000 to Existing system · Community composting	<u>Residential Household Composting</u> · Backyard composter distribution programs (21,300 units by end of '92) · Distribution of additional backyard composters - being handled by individual municipalities · Community composting

TABLE 7.5
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING/COMMITTED
(continued)

Generic Components Existing Within the GTA	REGIONS				
	Durham	Metro Toronto	York	Peel	Halton
Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) Special curbside collections of Christmas trees Special and weekly curbside collections of white goods Drop-off depots for white goods Special curbside collection for bulky items Permanent drop-off depot for HHW Special HHW drop-off days · Toxic Taxi service Mobile HHW depots	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Permanent drop-off depots for HHW at Brock West landfill, Scugog and Oshawa transfer stations · Toxic taxi service (discontinued in fall 1992)	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Curbside collection of white goods (East York, Etobicoke, York) · Drop-off depots for white goods (Etobicoke) · Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill) · Two toxic taxis	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collection of Christmas trees · Curbside collection of white goods in all municipalities - frequency varies · Richmond Hill now reclaims CFC and compressor oil and sends units for shredding and recycling · Some municipalities conduct HHW collection days · Richmond Hill operates mobile HHW depot; Region of York also ran successful pilot mobile HHW depot in 1992	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collection of Christmas trees · Special and weekly (e.g. Mississauga, Brampton) curbside collections of white goods · Drop-off depots for white goods (Brampton, Caledon) · Once a year HHW collection at Bolton Community Centre · Permanent drop-off depot for HHW at the Britannia Road landfill · Mixing of leaves with topsoil (Mississauga, 1992)	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees Both curbside and drop-off services for white goods · Two permanent HHW depots, one open three days a week and the other one ???
Composting Facilities Centralized windrow composting of leaf and yard waste In-vessel composting of source separated organics	Composting Facilities · Centralized windrow composting of leaf and yard waste	Composting Facilities · Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale site) · Centralized in vessel composting facility at Dufferin Transfer Station, with capacity of 200 tonnes/day (operated by Metro) · One new central composting facility (in vessel) with a capacity of 125,000 to 180,000 tonnes/year	Composting Facilities · Centralized windrow composting of leaf and yard waste operated by Miller Waste Systems · A private company called Canada Composting Inc. has received MOEE approval to build and operate an in-vessel composting facility with a processing capacity of 120,000 tonnes per year in Newmarket. It will take waste primarily from the IC&I sector but will also receive as much as 7,000 tonnes per year of residential waste from Newmarket A composting facility to be operated by Mammone Disposal Systems Ltd. is awaiting MOEE approval	Composting Facilities · Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill) · One new central composting facility (in vessel) which may be shared with Region of Halton. Capacity 69,000 tonnes/year	Composting Facilities · Scotts Farms in Milton 4 acre windrow facility in Oakville for leaf and yard waste · Other municipalities deliver leaf and yard waste to local farmers and landscaping companies and Milton collects pumpkins following Halloween and delivers them to a local pig farmer for animal feed One new central composting facility (may be shared with Peel)

TABLE 7.5
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING/COMMITTED
(continued)

Generic Components Existing Within the GTA	REGIONS				
	Durham	Metro Toronto	York	Peel	Halton
Composting Facilities - continued			· A small leaf composting leaf to be operated by George Sant & Sons		
Reuse Centres and Activities · Municipal reuse centre · Private reuse centre · Non-profit reuse centre · Charitable reuse centres · Food reuse organization · Special goods exchange days	Reuse Centres and Activities · Goodwill trailers located throughout Region · Attended donation centre at Riston transfer station	Reuse Centres and Activities · Goods exchange days organized by East York · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest) · Re-Uze Centre in Scarborough	Reuse Centres and Activities · Goods exchange days in Richmond Hill	Reuse Centres and Activities · Municipal reuse centre (Caledon landfill scavenging centre, Albion and Brampton goods exchanges) · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest)	Reuse Centres and Activities · Wastewise in Halton Hills operates as community based resource centre and diversion facility Includes four different components 1)education centre and information service 2)reuse centre accepting and selling household goods 3)repair centre repairing household appliances, power tools and equipment 4)recycling depot for materials not accepted by Blue Box, including: six grades of plastic, eight grades of paper, scrap metal, textiles, aggregate, egg cartons, rubber, film canisters, coat hangers, etc.
Public MRFs · Processing centre for dry recyclables · Improvements/expansion to existing MRFs	Public MRFs · One processing centre (MRFs) for dry recyclables collected from the residential (and minor amounts from the commercial/ institutional) sector. Owned by the municipality and operated by municipal staff · Improvements/expansion to the existing Regional MRF	Public MRFs · QUNO MRF on Commissioners Street, which processed fibres and container materials under contract to Metro in 1992. Operation being changed in 1993 to process fibres only · CRinc MRF on Commissioners Street, which started operation in May 1992. It processes only container materials (plastic, metals and glass). The facility is owned by Metro, and is operated under contract by CRinc	Public MRFs · Markham MRF owned by Markham but operated by Miller Waste Systems. Currently operating on a temporary basis (will be replaced by new Regional facility that is being built). Processes ONP, container materials and other recyclables - 15,300 tonnes in 1992 · Richmond Hill MRF operated by Miller - 12,000 tonnes processed in 1992. It too will be replaced by planned Regional facility	Public MRFs · Mississauga processing centre (MRF) for dry recyclables collected form the residential (and minor amounts from the commercial/institutional) sector in Mississauga and Brampton. Owned by the Region of Peel and operated by Laidlaw · MRF/transfer station in Bolton for Caledon material · One new Regional MRF for processing of dry recyclables	Public MRFs · Regional MRF, owned by Region and operated by Halton Recycled Resources Inc. under contract to the Region, processes Region's recyclables · Region now using private MRF owned by Halton Recycled Resources and operated under contract to the Region

TABLE 7.5
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING/COMMITTED
(continued)

Generic Components Existing Within the GTA	REGIONS				
	Durham	Metro Toronto	York	Peel	Halton
Public MRFs - continued		· Dufferin Street MRF is owned by Metro and operated by QUNO · One or two new Regional MRFs for processing of dry recyclables	· One new Regional MRF for processing of dry recyclables to be operational in 1993		
Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables · Depots located at transfer stations/landfills	Residential Recycling Depots and Transfer Stations · Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) · Depots located at transfer stations to provide recycling opportunities to self-haul generators · Drop-off depot for white-goods (Lasco)	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables (including all banned materials) at landfills (confirm) · Depots located at transfer stations to provide recycling opportunities to self-haul generators (confirm) · Igloos and domes provide opportunities to recycle in public areas · Depots for voluntary recycling by residents (e.g. Scarborough) · New engineered recycling depot at a landfill or transfer station, similar to facility installed by Region of Waterloo. Depots for different materials are arranged so that residents drive to the top of a loading facility and drop recyclables into different bins · Additional roll-off containers for source separation of banned materials at landfills	Residential Recycling Depots and Transfer Stations · Markham operates a depot that accepts boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill · Depots located at transfer stations to provide recycling opportunities to self-haul generators · 7-community recycling centres: 3 in Mississauga, 2 in Brampton and 2 in Caledon, to accept recyclables, HHW, reusable items and residential waste · Construction of mini-recycling depots and satellite drop-off facilities for recycling	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables at new landfill · New HHW depot to be located at new Regional landfill site
Residential Promotion and Education · 3Rs promotion and education program · Consumer education program	Residential Promotion and Education · 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · Promotional video on home composting	Residential Promotion and Education · Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages	Residential Promotion and Education · Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities · Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers	Residential Promotion and Education · 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc.	Residential Promotion and Education · Extensive promotion of backyard composting conducted on a municipal level. Promotion efforts include advertising, open houses and seminar hosted by RCO · Halton Hills currently conducting survey to determine community's interest in backyard composting

TABLE 7.5
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL EXISTING/COMMITTED
(continued)

Generic Components Existing Within the GTA	REGIONS				
	Durham	Metro Toronto	York	Peel	Halton
Residential Promotion and Education - continued		· Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto" · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc.	· Richmond Hill and Markham conducted extensive door-to-door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools		· $107,400 has been allocated in the 1993 budget for additional waste reduction education programs and display material design to increase participation rates · Wastewise producing a guide on how to start a community resource centre

TABLE 7.6
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL DIRECT COST

Generic Components Existing Within the GTA	REGIONS			
	Durham	Metro Toronto	York	Peel
Garbage Collection and Disposal · Direct Cost system for garbage collection · Curbside collection of residential garbage from single family dwellings · Collection of residential garbage from multi-family units · Self haul of garbage · Regional recycling legislation	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents · *Direct Cost system for garbage collection*	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents · *Direct Cost system for garbage collection from households currently serviced by municipal forces (assumed to be all single family residents, and 40% of "other" household category)*	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwelling by contractors to municipalities on weekly basis · Collection of residential garbage from multi-family units by private contractors · Self-haul of garbage to landfills and transfer stations by rural residents · Newmarket is examining details for a Wet/Dry collection system for the whole Town, in conjunction with a planned private in-vessel composting facility (see details below) that will be built in the Town · *Direct Cost system for garbage collection*	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors · Self haul of garbage to landfills and transfer stations by rural residents · *Direct Cost system for garbage collection*
Residential Recycling and Collection · Curbside collection of Blue Box materials · Expanding curbside collection · Collection of bins of recyclables from multi-family units · Drop-off depot for multi-family dwellings not serviced by recycling	Residential Recycling and Collection · Curbside collection of Blue Box materials bi-weekly, from single family dwellings. Materials include: ONP, telephone directories, OCC, PET, HDPE, glass, ferrous, aluminum · Collection of bins of recyclables from multi-family units	Residential Recycling and Collection · Curbside collection of Blue Box materials form single family dwellings and some apartment buildings. Typical materials include: ONP, OCC, telephone directories, magazines, PET, HDPE, glass, ferrous, aluminum (Caledon), these and telephone directories in Brampton	Residential Recycling and Collection · Region is only municipality within GTA not co-ordinating recycling programs of member municipalities · All municipalities except Whitchurch-Stouffville and King Township receive weekly curbside collection of recyclables on same day as garbage collection · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)	Residential Recycling and Collection · Curbside collection of Blue Box materials from single family dwellings and some apartment buildings. Typical materials include at least: ONP, PET, glass, ferrous, aluminum (Caledon), these and telephone directories in Brampton

TABLE 7.6
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL DIRECT COST
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Residential Recycling and Collection - continued · Community recycling centres · Recycling at all multi-family buildings of 6 or more units (3Rs regulations) · Blue Box recycling mandated · Engineered recycling depot · Drop-off depot for rural households	· Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depot for rural households · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)	· Collection of bins of recyclables from multi-family units · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depots for rural households · Recycling to all apartments in buildings containing 6 or more units (3Rs Regulations) · Some additional recycling service to multi-family units · Some additional recycling at new depots	· Bi-weekly collection of recyclables in Whitchurch-Stouffville; King Township collects on a different day from regular garbage · Materials collected by different municipalities include: ONP, glass, steel, aluminum, PET, OCC, telephone directories, HDPE, rigid and other plastics	· Expanded curbside collection (Mississauga) to collect additional materials (HDPE, mixed plastic, textiles, OMG, OCC) · Collection of bins of recyclables from multi-family units · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depots for rural households · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)
Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste	Residential Leaf and Yard Waste Collection · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste (depots located at transfer station and other convenient sites)	Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste	Residential Leaf and Yard Waste Collection · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste at Regions composting site; no charge to residents	Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste

TABLE 7.6
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL DIRECT COST
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	Metro Toronto	York	Peel
Residential Household Composting · Door-to-door distribution of backyard composters to 80% of single family households · Promotion of vermi-composting to multi-family units · Large 3-bin composting units distributed to apartment and co-operative housing complexes · Community composting	Residential Household Composting · Door-to-door distribution of backyard composters to 80% of single family households · Promotion of vermi-composting to multi-family units · Large 3-bin composting units distributed to apartment and co-operative housing complexes · Community composting	Residential Household Composting · Door-to-door distribution of backyard composters to 80% of single family and some of "other" households · Promotion of vermi-composting to multi-family units · Large 3-bin composting units distributed to apartment and co-operative housing complexes · Community composting	Residential Household Composting · Door-to-door distribution of backyard composters to 80% of single family households · Promotion of vermi-composting to multi-family units · Large 3-bin composting units distributed to apartment and co-operative housing complexes · Community composting	Residential Household Composting · Door-to-door distribution of backyard composters to 80% of single family households· Promotion of vermi-composting to multi-family units · Large 3-bin composting units distributed to apartment and co-operative housing complexes · Community composting
Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Special and weekly curbside collections of white goods · Drop-off depots for white goods · Special curbside collection for bulky items · Permanent drop-off depot for HHW · Special HHW drop-off days · Toxic Taxi service · Mobile HHW depots	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Permanent drop-off depots for HHW at Brock West landfill, Scugog and Oshawa transfer stations · Toxic taxi service (discontinued in fall 1992)	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Curbside collection of white goods (East York, Etobicoke, York) · Drop-off depots for white goods (Etobicoke) · Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill) · Two toxic taxis	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collection of Christmas trees · Curbside collection of white goods in all municipalities - frequency varies · Richmond Hill now reclaims CFC and compressor oil and sends units for shredding and recycling · Some municipalises conduct HHW collection days · Richmond Hill operates mobile HHW depot; Region of York also ran successful pilot mobile HHW depot in 1992	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special and weekly (e.g. Mississauga, Brampton) curbside collections of white goods · Drop-off depots for white goods (Brampton, Caledon) · Once a year HHW collection at Bolton Community Centre · Permanent drop-off depot for HHW at the Britannia Road landfill · Mixing of leaves with topsoil (Mississauga, 1992)

TABLE 7.6
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL DIRECT COST
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	Metro Toronto	York	Peel
Composting Facilities · Centralized windrow composting of leaf and yard waste · In-vessel composting of source separated organics	Composting Facilities · Centralized windrow composting of leaf and yard waste	Composting Facilities · Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale site) · Centralized in-vessel composting facility at Dufferin Transfer Station, with capacity of 200 tonnes/day (operated by Metro) · One new central composting facility (in-vessel) with a capacity of 125,000 to 180,000 tonnes/year	Composting Facilities · Centralized windrow composting of leaf and yard waste operated by Miller Waste Systems · A private company called Canada Comosting Inc. has received MOEE approval to build and operate an in-vessel composting facility with a processing capacity of 120,000 tonnes per year in Newmarket. It will take waste primarily from the IC&I sector but will also receive as much as 7,000 tonnes per year of residential waste from Newmarket · A composting facility to be operated by Mammone Disposal Systems Ltd. is awaiting MOEE approval · A small leaf composting facility to be operated by George Sant & Sons	Composting Facilities · Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill) · One new central composting facility (in-vessel) which may be shared with Region of Halton. Capacity 69,000 tonnes/year
Reuse Centres and Activities · Municipal reuse centre · Private reuse centre · Non-profit reuse centre · Charitable reuse centres · Food reuse organization · Special goods exchange days	Reuse Centres and Activities · Goodwill trailers located throughout Region · Attended donation centre at Riston transfer station	Reuse Centres and Activities · Goods exchange days organized by East York · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest) · Re-Uze Centre in Scarborough	Reuse Centres and Activities · Goods exchange days in Richmond Hill	Reuse Centres and Activities · Municipal reuse centre (Caledon landfill scavenging centre, Albion and Brampton goods exchanges) · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest)

TABLE 7.6
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL DIRECT COST
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
<u>Public MRFs</u> · Processing centre for dry recyclables · Improvements/expansions to existing MRF	<u>Public MRFs</u> · One processing centre (MRFs) for dry recyclables collected from the residential (and minor amounts from the commercial/ institutional) sector. Owned by the municipality and operated by municipal staff · Improvements/expansions to the existing Regional MRF	<u>Public MRFs</u> · QUNO MRF on Commissioners Street, which processed fibres and container materials under contract to Metro in 1992. Operation being changed in 1993 to process fibres only · CRinc MRF on Commissioners Street, which started operation in May 1992. It processes only container materials (plastic, metals and glass). The facility is owned by Metro, and is operated under contract by CRinc · Dufferin Street MRF is owned by Metro and operated by QUNO · One or two new Regional MRFs for processing of dry recyclables	<u>Public MRFs</u> · Markham MRF owned by Markham but operated by Miller Waste Systems. Currently operating on a temporary basis (will be replaced by new Regional facility that is being built). Processes ONP, container materials and other recyclables - 15,300 tonnes in 1992 · Richmond Hill MRF operated by Miller - 12,000 tonnes processed in 1992. It too will be replaced by planned Regional facility · One new Regional MRF for processing of dry recyclables to be operational in 1993	<u>Public MRFs</u> · Mississauga processing centre (MRF) for dry recyclables collected from the residential (and minor amounts from the commercia/institutional) sector in Mississauga and Brampton. Owned by the Region of Peel and operated by Laidlaw · MRF/transfer station in Bolton for Caledon material · One new Regional MRF for processing of dry recyclables
<u>Residential Recycling Depots and Transfer Stations</u> · Drop-off depot for dry recyclables · Depots located at transfer stations/landfills	<u>Residential Recycling Depots and Transfer Stations</u> · Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) · Depots located at transfer stations to provide recycling opportunities to self-haul generators · Drop-off depot for white-goods (Lasco)	<u>Residential Recycling Depots and Transfer Stations</u> · Drop-off depot for dry recyclables (including all banned materials) at landfills · Depots located at transfer stations to provide recycling opportunities to self-haul generators · Igloos and domes provide opportunities to recycle in public areas	<u>Residential Recycling Depots and Transfer Stations</u> · Markham operates a depot that accepts boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	<u>Residential Recycling Depots and Transfer Stations</u> · Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill · Depots located at transfer stations to provide recycling opportunities to self-haul generators

TABLE 7.6
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL DIRECT COST
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Residential Recycling Depots and Transfer Stations - continued		· Depots for voluntary recycling by residents (e.g. Scarborough) · New engineered recycling depot at a landfill or transfer station, similar to facility installed by Region of Waterloo. Depots for different materials are arranged so that residents drive to the top of a loading facility and drop recyclables into different bins · Additional roll-off containers for source separation of banned materials at landfills		· 7-community recycling centres: 3 in Mississauga, 2 in Brampton and 2 in Caledon, to accept recyclables, household hazardous waste, reusable items and residential waste · Construction of mini-recycling depots and satellite drop-off facilities for recycling
Residential Promotion and Education · 3Rs promotion and education program · Consumer education program · *Promotion/education program on Direct Cost system* · *Promotion/education program on source reduction/pre-cycling, reuse and recycling*	Residential Promotion and Education · 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · Promotional video on home composting · *Promotion/education program on Direct Cost system* · *Promotion/education program on source reduction/pre-cycling, reuse and recycling*	Residential Promotion and Education · Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages · Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto"	Residential Promotion and Education · Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities · Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers · Richmond Hill and Markham conducted extensive door-to-door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools · *Promotion/education program on Direct Cost system*	Residential Promotion and Education · 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · *Promotion/education program on Direct Cost system* · *Promotion/education program on source reduction, pre-cycling, composting reuse and recycling*

TABLE 7.6
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL DIRECT COST
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	Metro Toronto	York	Peel
Residential Promotion and Education - continued		· Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · *Promotion/education on Direct Cost program* · *Promotion/education program on source reduction/pre-cycling, reuse and recycling*	· *Promotion/education program on source reduction/pre-cycling, reuse and recycling*	

TABLE 7.7
LIST OF SYSTEM COMPONENTS

SYSTEM: EXPANDED BLUE BOX

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings · Collection of residential garbage from multi-family units · Self-haul of garbage · Regional recycling legislation	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipalities or contractors to municipalities · Collection of residential garbage from multi-family units by municipalities or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipalities or contractors to municipalities · Collection of residential garbage from multi-family units by municipalities or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwelling by contractors to municipalities on weekly basis · Collection of residential garbage from multi-family units by private contractors · Self-haul of garbage to landfills and transfer stations by rural residents · Newmarket is examining details for a Wet/Dry collection system for the whole Town, in conjunction with a planned private in-vessel composting facility (see details below) that will be built in the Town	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipalities or contractors to municipalities · Collection of residential garbage from multi-family units by municipalities or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents
Residential Recycling and Collection · Curbside collection of Expanded Blue Box materials · Expanding curbside collection · Collection of bins of recyclables from multi-family units · Drop-off depot for multi-family dwellings not serviced by recycling · Community recycling centres · Recycling at all multi-family buildings of 6 or more units	Residential Recycling and Collection · Drop-off depot for rural households · *Curbside collection of Expanded Blue Box materials including: plastics, (PET, rigid plastic, bottles and tubes, film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogue and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles*	Residential Recycling and Collection · Drop-off depots for rural households · *Curbside collection of Expanded Blue Box materials including: plastics (PET, rigid plastic, bottles and tubes, film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, telephone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil); clear and coloured glass and textiles*	Residential Recycling and Collection · Drop-off depot for rural households · *Curbside collection of Expanded Blue Box materials including: plastics, (PET, rigid plastic, bottles and tubes, film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil), clear and coloured glass and textiles* · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)	Residential Recycling and Collection · Drop-off depot for rural households · *Curbside collection of Expanded Blue Box materials including: plastics, (PET, rigid plastic, bottles and tubes, film plastic, foam plastic and rigid trays); paper fibre (ONP, OCC, boxboard, polycoat, phone books, magazines and catalogues and mixed household paper); metal (steel and aluminum cans, aluminum trays and foil); clear and coloured glass and textiles*

TABLE 7.7
LIST OF SYSTEM COMPONENTS
SYSTEM: EXPANDED BLUE BOX
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Residential Recycling and Collection - continued · Blue Box recycling mandated · Engineered recycling depot · Drop-off depot for rural households	· *Collection of bins of recyclables (collecting all Expanded Blue Box materials) from multi-family units* · *Drop-off depots for multi-family dwellings not serviced by recycling* · *Recycling at all multi-family buildings of 6 or more units (3Rs regulations), collecting all Expanded Blue Box materials*	· *Collection of bins of recyclables (collecting all Expanded Blue Box materials) from multi-family units* · *Drop-off depots for multi-family dwellings not serviced by recycling, for full range of Expanded Blue Box materials* · *Recycling of full range of Expanded Blue Box materials at all multi-family buildings of 6 or more units (3Rs regulations)*	· *Collection of bins of recyclables (collecting all Expanded Blue Box materials) from multi-family units* · *Drop off depots for multi-family dwellings not serviced by recycling for full range of Expanded Blue Box materials* · *Recycling at all multi-family buildings of 6 or more units (3Rs regulations), collecting all Expanded Blue Box materials*	· *Collection of bins of recyclables (collecting all Expanded Blue Box materials) from multi-family units* · *Drop-off depots for multi-family dwellings not serviced by recycling, for full range of Expanded Blue Box materials* · *Recycling at all multi-family buildings of 6 or more units (3Rs regulations) collecting all Expanded Blue Box Materials*
Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste	Residential Leaf and Yard Waste Collection · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste (depots located at transfer station and other convenient sites)	Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste	Residential Leaf and Yard Waste Collection · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste at Regions composting site; no charge to residents	Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste
Residential Household Composting · Backyard composter distribution programs · Large 3-bin composting units distributed to apartment and cooperative housing complexes · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Promotion of vermi-composting to multi family units*	Residential Household Composting · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Promotion of vermi-composting to multi-family units* · *Promotion of large 3-bin composting units distributed to apartment and cooperative housing complexes*	Residential Household Composting · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Promotion of vermi-composting to multi-family units* · *Promotion of large 3-bin composting units distributed to apartment and co-operative housing complexes*	Residential Household Composting · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Promotion of vermi-composting to multi-family units* · *Promotion of large 3-bin composting units distributed to apartment and co-operative housing complexes*	Residential Household Composting · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Promotion of vermi-composting to multi-family units* · *Large 3-bin composting units distributed to apartment and co-operative housing complexes*

TABLE 7.7
LIST OF SYSTEM COMPONENTS
SYSTEM: EXPANDED BLUE BOX
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	Metro Toronto	York	Peel
<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collections of Christmas trees · Special and weekly curbside collections of white goods · Drop-off depots for white goods · Special curbside collection for bulky items · Permanent drop-off depot for HHW · Special HHW drop-off days · Toxic Taxi service · Mobile HHW depots	<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collections of Christmas trees · Permanent drop-off depots for HHW at Brock West landfill, Scugog and Oshawa transfer stations · Toxic taxi service (discontinued in fall 1992)	<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collections of Christmas trees · Curbside collection of white goods (East York, Etobicoke, York) · Drop-off depots for white goods (Etobicoke) · Ten permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill) · Two toxic taxis	<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collections of Christmas trees · Curbside collection of white goods in all municipalities - frequency varies · Richmond Hill now reclaims CFC and compressor oil and sends units for shredding and recycling · Some municipalities conduct HHW collection days · Richmond Hill operates mobile HHW depot; Region of York also ran successful pilot mobile HHW depot in 1992	<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collection of Christmas trees · Special and weekly (e.g. Mississauga, Brampton) curbside collections of white goods · Drop-off depots for white goods (Brampton, Caledon) · Once a year HHW collection at Bolton Community Centre · Permanent drop-off depot for HHW at the Britannia Road landfill · Mixing of leaves with topsoil (Mississauga, 1992)

TABLE 7.7
LIST OF SYSTEM COMPONENTS
SYSTEM: EXPANDED BLUE BOX
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	Metro Toronto	York	Peel
Composting Facilities · Centralized windrow composting of leaf and yard waste · In-vessel composting of source separated organics	Composting Facilities · Centralized windrow composting of leaf and yard waste	Composting Facilities · Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale site) · Centralized in-vessel composting facility at Dufferin Transfer Station, with capacity of 200 tonnes/day (operated by Metro) · One new central composting facility (in-vessel) with a capacity of 125,000 to 180,000 tonnes/year	Composting Facilities · Centralized windrow composting of leaf and yard waste operated by Miller Waste Systems · A private company called Canada Composting Inc. has received MOEE approval to build and operate an in-vessel composting facility with a processing capacity of 120,000 tonnes per year in Newmarket. It will take waste primarily from the IC&I sector but will also receive as much as 7,000 tonnes per year of residential waste from Newmarket · A composting facility to be operated by Mammone Disposal Systems Ltd. is awaiting MOEE approval · A small leaf composting facility to be operated by George Sant & Sons	Composting Facilities · Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill) · One new central composting facility (in-vessel) which may be shared with Halton Region. Capacity 69,000 tonnes/year
Reuse Centres and Activities · Municipal reuse centre · Private reuse centre · Non profit reuse centre · Charitable reuse centres · Food reuse organization · Special goods exchange days	Reuse Centres and Activities · Goodwill trailers located throughout Region · Attended donation centre at Riston transfer station	Reuse Centres and Activities · Goods exchange days organized by East York · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest) · Re-Uze Centre in Scarborough	Reuse Centres and Activities · Goods exchange days in Richmond Hill	Reuse Centres and Activities · Municipal reuse centre (Caledon landfill scavenging centre, Albion and Brampton goods exchanges) · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest)

TABLE 7.7
LIST OF SYSTEM COMPONENTS
SYSTEM: EXPANDED BLUE BOX
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Public MRFs · Processing centre for dry recyclables · *Construct new MRF or improve/expand existing MRF*	Public MRFs · One processing centre (MRFs) for dry recyclables collected from the residential (and minor amounts from the commercial/ institutional) sector. Owned by the municipality and operated by municipal staff · *Construct new MRF, or improve/expand existing MRF to process larger stream of dry recyclables*	Public MRFs · QUNO MRF on Commissioners Street, which processed fibres and container materials under contract to Metro in 1992. Operation being changed in 1993 to process fibres only · CRinc MRF on Commissioners Street, which started operation in May 1992. It processes only container materials (plastic, metals and glass). The facility is owned by Metro, and is operated under contract by CRinc · Dufferin Street MRF is owned by Metro and operated by QUNO · One or two new Regional MRFs for processing of dry recyclables	Public MRFs · Markham MRF owned by Markham but operated by Miller Waste Systems. Currently operating on a temporary basis (will be replaced by new Regional facility that is being built). Processes ONP, container materials and other recyclables - 15,300 tonnes in 1992 · *Planned new MRF would have to expand to necessary capacity*	Public MRFs · Mississauga processing centre (MRF) for dry recyclables collected form the residential (and minor amounts from the commercia/institutional) sector in Mississauga and Brampton. Owned by the Region of Peel and operated by Laidlaw · MRF/transfer station in Bolton for Caledon material · One new Regional MRF for processing of dry recyclables
Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables · Depots located at transfer stations	Residential Recycling Depots and Transfer Stations · Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) · Depots located at transfer stations to provide recycling opportunities to self-haul generators · Drop-off depot for white-goods (Lasco)	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables (including all banned materials) at landfills (confirm) · Depots located at transfer stations to provide recycling opportunities to self-haul generators (confirm) · Igloos and domes provide opportunities to recycle in public areas · Depots for voluntary recycling by residents (e.g. Scarborough)	Residential Recycling Depots and Transfer Stations · Markham operates a depot that accepts boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	Residential Recycling Depots and Transfer Stations · *Drop-off depot for dry recyclables at new landfill* · *New HHW depot to be located at new Regional landfill site*

TABLE 7.7
LIST OF SYSTEM COMPONENTS
SYSTEM: EXPANDED BLUE BOX
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Residential Recycling Depots and Transfer Stations - continued		· New engineered recycling depot at a landfill or transfer station, similar to facility installed by Region of Waterloo. Depots for different materials are arranged so that residents drive to the top of a loading facility and drop recyclables into different bins · Additional roll-off containers for source separation of banned materials at landfills		
Residential Promotion and Education · 3Rs promotion and education program · Consumer education program · *Promotion/education program on Expanded Blue Box program* · *Promotion/education program on source reduction/pre-cycling, reuse and recycling*	Residential Promotion and Education · 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · Promotional video on home composting · *Promotion/education program on Expanded Blue Box program* · *Promotion/education program on source reduction/pre-cycling, reuse and recycling*	Residential Promotion and Education · Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages · Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto"	Residential Promotion and Education · Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities · Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers · Richmond Hill and Markham conducted extensive door-to-door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools	Residential Promotion and Education · 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · Promotion/education on Expanded Blue Box program · Promotion/education program on source reduction, pre-cycling, composting, reuse and recycling

TABLE 7.7
LIST OF SYSTEM COMPONENTS
SYSTEM: EXPANDED BLUE BOX
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	Metro Toronto	York	Peel
Residential Promotion and Education - continued		· Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · *Promotion/education on Expanded Blue Box program* · *Promotion/education program on source reduction, pre-cycling, composting, reuse and recycling*	· *Promotion/education on Expanded Blue Box program* · *Promotion/education program on source reduction, pre-cycling, composting, reuse and recycling*	

TABLE 7.8
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL WET/DRY

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Garbage Collection and Disposal · Self-haul of garbage · Regional recycling legislation · *Curbside collection of residential garbage from single family dwellings in three streams* · *Collection of residential garbage from multi-family units in three streams*	Garbage Collection and Disposal · *Curbside collection of residential waste from single family dwellings in three streams by specially designed trucks by municipalities or contractors to municipalities* · *Collection of residential garbage from multi-family units in three streams by municipalities or private contractors*	Garbage Collection and Disposal · *Curbside collection of residential waste from single family dwellings in three streams by specially designed trucks by municipalities or contractors to municipalities* · *Collection of residential garbage from multi-family units in three streams by municipalities or private contractors*	Garbage Collection and Disposal · *Curbside collection of residential waste from single family dwellings in three streams by specially designed trucks by municipalities or contractors to municipalities* · *Collection of residential garbage from multi-family units in three streams by municipalities or private contractors*	Garbage Collection and Disposal · *Curbside collection of residential waste from single family dwellings in three streams by specially designed trucks by municipalities or contractors to municipalities* · *Collection of residential garbage from multi-family units in three streams by municipalities or private contractors*
Residential Recycling and Collection · Drop-off depot for multi-family dwellings not serviced by recycling · Drop-off depot for rural households · *Provide carts to all single family households* · *Separation of waste into three streams*	Residential Recycling and Collection · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depot for rural households · *Provide carts to all single family households* · *Separation of waste into three streams (wet, dry and garbage) by the householder* · *Large bins provided in the garbage management area of multi-family buildings for voluntary separation of three streams (in sealed bags) by residents* · *Three stream collection in all multi-family buildings containing 6 or more units*	Residential Recycling and Collection · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depots for rural households · *Provide 90 gallon (240 L) carts to all single family and some "other" households* · *Separation of waste into three streams (wet, dry and garbage) by the householder* · *Assume that multi-family units will not be provided with special containers but will be encouraged to separate their waste into three separate bags* · *Three stream collection in all multi-family buildings containing 6 or more units*	Residential Recycling and Collection · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depot for rural households · *Provide carts to all single family households* · *Separation of waste into three streams (wet, dry and garbage) by the householder* · *Large bins provided in the garbage management area of multi-family buildings for voluntary separation of three streams (in sealed bags) by residents* · *Three stream collection in all multi-family buildings containing 6 or more units*	Residential Recycling and Collection · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depots for rural households · *Provide 90 gallon (240 L) carts to all single family households* · *Separation of waste into three streams (wet, dry and garbage) by the householder* · *Confirm system for multi-family units (2 additional components to follow)* · *Three stream collection in all buildings containing 6 or more units*
Residential Leaf and Yard Waste Collection · Drop-off depot for leaf and yard waste · *Seasonal separate collection of leaf and yard waste*	Residential Leaf and Yard Waste Collection · *Seasonal separate collection of leaf and yard waste*	Residential Leaf and Yard Waste Collection · *Seasonal separate collection of leaf and yard waste*	Residential Leaf and Yard Waste Collection · *Seasonal separate collection of leaf and yard waste*	Residential Leaf and Yard Waste Collection · *Seasonal separate collection of leaf and yard waste*

TABLE 7.8
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL WET/DRY
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Residential Household Composting · Large 3-bin composting units distributed to apartment and co-operative housing complexes · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Vermi-composting for multi-family households*	Residential Household Composting · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Large 3-bin composting units distributed to apartment and co-operative housing complexes* · *Vermi-composting for multi-family households*	Residential Household Composting · Community composting · *Door-to-door distribution of backyard composters to 80% of single family and some of "other" households* · *Large 3-bin composting units distributed to apartment and co-operative housing complexes* · *Vermi-composting for multi-family households*	Residential Household Composting · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Large 3-bin composting units distributed to apartment and co-operative housing complexes* · *Vermi-composting for multi-family households*	Residential Household Composting · Community composting · Door-to-door distribution of backyard composters to 80% of single family households · Large 3-bin composting units distributed to apartment and co-operative housing complexes · Vermi-composting for multi-family households
Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Special and weekly curbside collections of white goods · Drop-off depots for white goods · Special curbside collection for bulky items · Permanent drop-off depot for HHW · Special HHW drop-off days · Toxic Taxi service · Mobile HHW depots	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Permanent drop-off depots for HHW at Brock West landfill, Scugog and Oshawa transfer stations · Toxic taxi service (discontinued in fall 1992)	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collections of Christmas trees · Curbside collection of white goods (East York, Etobicoke, York) · Drop-off depots for white goods (Etobicoke) · Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill) · Two toxic taxis	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collection of Christmas trees · Curbside collection of white goods in all municipalities - frequency varies · Richmond Hill now reclaims CFC and compressor oil and sends units for shredding and recycling · Some municipalities conduct HHW collection days · Richmond Hill operates mobile HHW depot; Region of York also ran successful pilot mobile HHW depot in 1992	Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.) · Special curbside collection of Christmas trees · Special and weekly (e.g. Mississauga, Brampton) curbside collections of white goods · Drop-off depots for white goods (Brampton, Caledon) · Once a year HHW collection at Bolton Community Centre · Permanent drop-off depot for HHW at the Britannia Road landfill · Mixing of leaves with topsoil (Mississauga, 1992)

TABLE 7.8
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL WET/DRY
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
<u>Composting Facilities</u> · Centralized windrow composting of leaf and yard waste · *Central composting facilities (in-vessel or windrow) for composting of source separated household organics (wet stream)*	<u>Composting Facilities</u> · *Central composting facility (in-vessel) for composting of source separated household organics (wet stream)*	<u>Composting Facilities</u> · Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale site) · Centralized in-vessel composting facility at Dufferin Transfer Station, with capacity of 200 tonnes/day (operated by Metro) · One new central composting facility (in-vessel) with a capacity of 125,000 to 180,000 tonnes/year	<u>Composting Facilities</u> · Centralized windrow composting of leaf and yard waste operated by Miller Waste Systems · A private company called Canada Composting Inc. has received MOEE approval to build and operate an in-vessel composting facility with a processing capacity of 120,000 tonnes per year in Newmarket. It will take waste primarily from the IC&I sector but will also receive as much as 7,000 tonnes per year of residential waste from Newmarket · A composting facility to be operated by Mannmone Disposal Systems Ltd. is awaiting MOEE approval · A small leaf composting facility to be operated by George Sant & Sons · *New central composting facility (in-vessel) for composting of source separated household organics (wet stream)*	<u>Composting Facilities</u> · Centralized windrow composting of leaf and yard waste (at Brampton site, Brittannia Road landfill and Caledon landfill) · *Central composting facilities (in vessel or windrow) for composting of source separated household organics (wet stream)*
<u>Reuse Centres and Activities</u> · Municipal reuse centre · Private reuse centre · Non-profit reuse centre · Charitable reuse centres · Food reuse organization · Special goods exchange days	<u>Reuse Centres and Activities</u> · Goodwill trailers located throughout Region · Attended donation centre at Riston transfer station	<u>Reuse Centres and Activities</u> · Goods exchange days organized by East York · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest) · Re-Uze Centre in Scarborough	<u>Reuse Centres and Activities</u> · Goods exchange days in Richmond Hill	<u>Reuse Centres and Activities</u> · Municipal reuse centre (Caledon landfill scavenging centre, Albion and Brampton goods exchanges) · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest)

TABLE 7.8
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL WET/DRY
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Public MRFs · *New MRF or improve/expand existing MRFs to process larger dry stream of recyclables*	Public MRFs · One processing centre (MRFs) for dry recyclables collected from the residential (and minor amounts from the commercial/ institutional) sector. Owned by the municipality and operated by municipal staff · *New MRF or improve/expand existing MRFs to process larger dry stream of dry recyclables*	Public MRFs · QUNO MRF on Commissioners Street, which processed fibres and container materials under contract to Metro in 1992. Operation being changed in 1993 to process fibres only · CRinc MRF on Commissioners Street, which started operation in May 1992. It processes only container materials (plastic, metals and glass). The facility is owned by Metro, and is operated under contract by CRinc · Dufferin Street MRF is owned by Metro and operated by QUNO · One or two new Regional MRFs for processing of dry recyclables	Public MRFs · Markham MRF owned by Markham but operated by Miller Waste Systems. Currently operating on a temporary basis (will be replaced by new Regional facility that is being built). Processes ONP, container materials and other recyclables - 15,300 tonnes in 1992 · *New MRF or improve/expand existing MRF to process larger dry stream of dry recyclables*	Public MRFs · Mississauga processing centre (MRF) for dry recyclables collected form the residential (and minor amounts from the commercial/institutional) sector in Mississauga and Brampton. Owned by the Region of Peel and operated by Laidlaw · *The new MRF considered under the Existing/Committed system scaled to accommodate processing of a larger dry stream of recyclables*

TABLE 7.8
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL WET/DRY
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables · Depots located at transfer stations/landfills	Residential Recycling Depots and Transfer Stations · Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) · Depots located at transfer stations to provide recycling opportunities to self-haul generators · Drop-off depot for white-goods (Lasco)	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables (including all banned materials) at landfills (confirm) · Depots located at transfer stations to provide recycling opportunities to self-haul generators (confirm) · Igloos and domes provide opportunities to recycle in public areas · Depots for voluntary recycling by residents (e.g. Scarborough) · New engineered recycling depot at a landfill or transfer station, similar to facility installed by Region of Waterloo. Depots for different materials are arranged so that residents drive to the top of a loading facility and drop recyclables into different bins · Additional roll-off containers for source separation of banned materials at landfills	Residential Recycling Depots and Transfer Stations · Markham operates a depot that accepts boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill · Depots located at transfer stations to provide recycling opportunities to self-haul generators · 7-community recycling centres: 3 in Mississauga, 2 in Brampton and 2 in Caledon, to accept recyclables, household hazardous waste, reusable items and residential waste · Construction of mini-recycling depots and satellite drop-off facilities for recycling

TABLE 7.8
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL WET/DRY
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Residential Promotion and Education	Residential Promotion and Education	Residential Promotion and Education	Residential Promotion and Education	Residential Promotion and Education
· 3Rs promotion and education program · Consumer education program · *Promotion/education program for Wet/Dry system* · *Promotion/education program for source reduction/pre-cycling, reuse and recycling*	· 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · Promotional video on home composting · *Promotion/education program for Wet/Dry system* · *Promotion/education program for source reduction/pre-cycling/reuse/recycling*	· Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost · information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages · Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto" · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · *Promotion/education for Wet/Dry system* · *Promotion/education for source reduction/pre-cycling/composting/reuse/recycling*	· Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities · Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers · Richmond Hill and Markham conducted extensive door-to-door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools · *Promotion/education program for Wet/Dry system* · *Promotion/education program for source reduction/pre-cycling/reuse/recycling*	· 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · *Promotion/education for Wet/Dry system* · *Promotion/education for source reduction/pre-cycling/composting/reuse/recycling*

TABLE 7.9
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL MIXED WASTE PROCESSING

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings · Collection of residential garbage from multi-family units · Self haul of garbage · Regional recycling legislation · *Drop off depot for rural households*	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Weekly curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi-family units by municipal forces or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents	Garbage Collection and Disposal · Curbside collection of residential garbage from single family dwelling by contractors to municipalities on weekly basis · Collection of residential garbage from multi-family units by private contractors · Self-haul of garbage to landfills and transfer stations by rural residents · Newmarket is examining details for a Wet/Dry collection system for the whole Town, in conjunction with a planned private in-vessel composting facility (see details below) that will be built in the Town	Garbage Collection and Disposal · Weekly curbside collection of residential garbage from single family dwellings by municipal forces or contractors to municipalities · Collection of residential garbage from multi family units by municipal forces or private contractors · Self-haul of garbage to landfills and transfer stations by rural residents
Residential Recycling and Collection · Curbside collection of Blue Box materials Expanding curbside collection · Collection of bins of recyclables from multi family units · Drop-off depot for multi-family dwellings not serviced by recycling	Residential Recycling and Collection · Curbside collection of Blue Box materials bi weekly, from single family dwellings. Materials include: ONP, telephone directories, OCC, PET, HDPE, glass, ferrous, aluminum · Collection of bins of recyclables from multi-family units	Residential Recycling and Collection · Curbside collection of Blue Box materials form single family dwellings and some apartment buildings. Typical materials include: ONP, OCC, telephone directories, magazines, PET, HDPE, glass, ferrous, aluminum (Caledon), these and telephone directories in Brampton	Residential Recycling and Collection · Region is only municipality within GTA not co-ordinating recycling programs of member municipalities · All municipalities except Whitchurch-Stouffville and King Township receive weekly curbside collection of recyclables · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)	Residential Recycling and Collection · Curbside collection of Blue Box materials from single family dwellings and some apartment buildings. Typical materials include: ONP, PET, glass, ferrous, aluminum (Caledon), these and telephone directors in Brampton

TABLE 7.9
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL MIXED SOLID WASTE PROCESSING
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Residential Recycling and Collection - continued · Community recycling centres · Recycling at all multi-family buildings of 6 or more units (3Rs regulations) · Blue Box recycling mandated · Engineered recycling depot	· Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depot for rural households · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)	· Collection of bins of recyclables from multi-family units · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depots for rural households · Recycling to all apartments in buildings containing 6 or more units (3Rs Regulations) · Some additional recycling service to multi-family units · Some additional recycling at new depots	· Bi-weekly collection of recyclables in Whitchurch-Stouffville; King Township collects on a different day from regular garbage · Materials collected by different municipalities include: ONP, glass, steel, aluminum, PET, OCC, telephone directories, HDPE, rigid and other plastics	· Expanded curbside collection (Mississauga) to collect additional materials (HDPE, mixed plastic, textiles, OMG, OCC) · Collection of bins of recyclables from multi-family units · Drop-off depots for multi-family dwellings not serviced by recycling · Drop-off depots for rural households · Recycling to all apartments in buildings containing 6 or more units (3Rs regulations)
Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste	Residential Leaf and Yard Waste Collection · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste (depots located at transfer station and other convenient sites)	Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste	Residential Leaf and Yard Waste Collection · Seasonal curbside collection of leaf and yard waste · Drop-off depot for leaf and yard waste at Regions composting site; no charge to residents	Residential Leaf and Yard Waste Collection · Curbside collection of leaf and yard waste

TABLE 7.9
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL MIXED SOLID WASTE PROCESSING
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
<u>Residential Household Composting</u> · Large 3-bin composting units distributed to apartment and co-operative housing complexes · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Vermi-composting for multi-family households*	<u>Residential Household Composting</u> · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Promotion of large 3-bin composting units distributed to apartment and co-operative housing complexes* · *Promotion of vermi-composting for multi-family households*	<u>Residential Household Composting</u> · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Promotion of vermi-composting to multi-family units* · *Large 3-bin composting units distributed to apartment and co-operative housing complexes*	<u>Residential Household Composting</u> · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Promotion of large 3-bin composting units distributed to apartment and co-operative housing complexes* · *Promotion of vermi-composting for multi-family households*	<u>Residential Household Composting</u> · Community composting · *Door-to-door distribution of backyard composters to 80% of single family households* · *Promotion of vermi-composting to multi-family units* · *Large 3-bin composting units distributed to apartment and co-operative housing complexes*
<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collections of Christmas trees · Special and weekly curbside collections of white goods · Drop-off depots for white goods · Special curbside collection for bulky items · Permanent drop-off depot for HHW · Special household hazardous waste drop-off days · Toxic Taxi service · Mobile HHW depots	<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collections of Christmas trees · Permanent drop-off depots for HHW at Brock West landfill, Scugog and Oshawa transfer stations · Toxic taxi service (discontinued in fall 1992)	<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collections of Christmas trees · Curbside collection of white goods (East York, Etobicoke, York) · Drop-off depots for white goods (Etobicoke) · Ten (10) permanent drop-off depots for HHW (8 in Metro, 1 at Keele Valley Landfill, one at Brock Road West landfill) · Two toxic taxis	<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collections of Christmas trees · Curbside collection of white goods in all municipalities - frequency varies · Richmond Hill now reclaims CFC and compressor oil and sends units for shredding and recycling · Some municipalities conduct HHW collection days · Richmond Hill operates mobile HHW depot; Region of York also ran successful pilot mobile HHW depot in 1992	<u>Other Residential Waste Diversion (HHW, Toxic Taxi, Pilot Wet-Dry, White Goods Collection, White Goods Drop-Off, etc.)</u> · Special curbside collection of Christmas trees · Special and weekly (e.g. Mississauga, Brampton) curbside collections of white goods · Drop-off depots for white goods (Brampton, Caledon) · Once a year HHW collection at Bolton Community Centre · Permanent drop-off depot for HHW at the Britannia Road landfill · Mixing of leaves with topsoil (Mississauga, 1992)

TABLE 7.9
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL MIXED SOLID WASTE PROCESSING
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Composting Facilities · Centralized windrow composting of leaf and yard waste · In-vessel composting of source separated organics · *New mixed waste processing and composting facility*	Composting Facilities · Centralized windrow composting of leaf and yard waste · *New mixed waste processing and composting facility*	Composting Facilities · Centralized windrow composting of leaf and yard waste in North York (3 sites), Scarborough (1 site), Etobicoke (1 site), and at Keele Valley (Metro operated Avondale site) · Centralized in-vessel composting facility at Dufferin Transfer Station, · with capacity of 200 tonnes/day (operated by Metro) · One new central composting facility (in-vessel) with a capacity of 125,000 to 180,000 tonnes/year · *New mixed waste processing and composting facility*	Composting Facilities · Centralized windrow composting of leaf and yard waste operated by Miller Waste Systems · A private company called Canada Composting Inc. has received MOEE approval to build and operate an in-vessel composting facility with a processing capacity of 120,000 tonnes per year in Newmarket. It will take waste primarily from the IC&I sector but will also receive as much as 7,000 tonnes per year of residential waste from Newmarket · A composting facility to be operated by Mammone Disposal Systems Ltd. is awaiting MOEE approval · A small leaf composting facility to be operated by George Sant & Sons · *New mixed waste processing and composting facility*	Composting Facilities · Centralized windrow composting of leaf and yard waste (at Brampton site, Britannia Road landfill and Caledon landfill) · One new central composting facility (in-vessel) which may be shared with Region of Halton. Capacity 69,000 tonnes/year · *New mixed waste processing and composting facility*
Reuse Centres and Activities · Municipal reuse centre · Private reuse centre · Non-profit reuse centre · Charitable reuse centres · Food reuse organization · Special goods exchange days	Reuse Centres and Activities · Goodwill trailers located throughout Region · Attended donation centre at Riston transfer station	Reuse Centres and Activities · Goods exchange days organized by East York · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest) · Re-Uze Centre in Scarborough	Reuse Centres and Activities · Goods exchange days in Richmond Hill	Reuse Centres and Activities · Municipal reuse centre (Caledon landfill scavenging centre, Albion and Brampton goods exchanges) · Charitable reuse centres run by social service organizations (Goodwill, Salvation Army, etc.) · Food reuse organization (such as Second Harvest)

TABLE 7.9
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL MIXED SOLID WASTE PROCESSING
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Public MRFs · Processing centre for dry recyclables ·	Public MRFs · One processing centre (MRFs) for dry recyclables collected from the residential (and minor amounts from the commercial/ institutional) sector. Owned by the municipality and operated by municipal staff · Improvements/expansions to the existing Regional MRF	Public MRFs · QUNO MRF on Commissioners Street, which processed fibres and container materials under contract to Metro in 1992. Operation being changed in 1993 to process fibres only · CRinc MRF on Commissioners Street, which started operation in May 1992. It processes only container materials (plastic, metals and glass). The facility is owned by Metro, and is operated under contract by CRinc · Dufferin Street MRF is owned by Metro and operated by QUNO · One or two new Regional MRFs for processing of dry recyclables	Public MRFs · Markham MRF owned by Markham but operated by Miller Waste Systems. Currently operating on a temporary basis (will be replaced by new Regional facility that is being built). Processes ONP, container materials and other recyclables - 15,300 tonnes in 1992 · Richmond Hill MRF operated by Miller - 12,000 tonnes processed in 1992. It too will be replaced by planned Regional facility · One new Regional MRF for processing of dry recyclables to be operational in 1993	Public MRFs · Mississauga processing centre (MRF) for dry recyclables collected form the residential (and minor amounts from the commercia/institutional) sector in Mississauga and Brampton. Owned by the Region of Peel and operated by Laidlaw · MRF/transfer station in Bolton for Caledon material · One new Regional MRF for processing of dry recyclables
Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables · Depots located at transfer stations	Residential Recycling Depots and Transfer Stations · Drop-off depots for recyclables (scrap metal, batteries, brush, drywall, HHW, tires, OCC and textiles) · Depots located at transfer stations to provide recycling opportunities to self-haul generators · Drop-off depot for white-goods (Lasco)	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables (including all banned materials) at landfills (confirm) · Depots located at transfer stations to provide recycling opportunities to self-haul generators (confirm) · Igloos and domes provide opportunities to recycle in public areas · Depots for voluntary recycling by residents (e.g. Scarborough)	Residential Recycling Depots and Transfer Stations · Markham operates a depot that accepts boxboard, mixed paper, scrap metal and tires, in addition to Blue Box materials	Residential Recycling Depots and Transfer Stations · Drop-off depot for dry recyclables (including all banned materials) at Britannia landfill · Depots located at transfer stations to provide recycling opportunities to self-haul generators · 7-community recycling centres: 3 in Mississauga, 2 in Brampton and 2 in Caledon, to accept recyclables, HHW, reusable items and residential waste

TABLE 7.9
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL MIXED SOLID WASTE PROCESSING
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	**Metro Toronto**	**York**	**Peel**
Residential Recycling Depots and Transfer Stations - continued		· New engineered recycling depot at a landfill or transfer station, similar to facility installed by Region of Waterloo. Depots for different materials are arranged so that residents drive to the top of a loading facility and drop recyclables into different bins · Additional roll-off containers for source separation of banned materials at landfills		· Construction of mini-recycling depots and satellite drop-off facilities for recycling
Residential Promotion and Education · 3Rs promotion and education program · Consumer education program · *Promotion/education program on source reduction/pre-cycling, reuse and recycling*	Residential Promotion and Education · 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · Promotional video on home composting · *Promotion/education program on source reduction/pre-cycling/reuse/recycling*	Residential Promotion and Education · Extensive promotion and education campaign on composting by the residential sector, which includes the Master Composter program operated for Metro by RCO, a compost information hotline, radio and newspaper advertisements, and backyard composting manuals in many languages · Extensive 3Rs promotion and education program, focused on the residential sector, which includes publishing "Your Guide to Reduction and Recycling in Metropolitan Toronto"	Residential Promotion and Education · Region only advertises HHW and leaf and yard waste programs. Other programs are left to the municipalities · Municipalities conduct extensive promotion through advertising, brochures, hotline phone service and information flyers · Richmond Hill and Markham conducted extensive door-to-door sales campaigns for composters with assistance from students. Markham also conducted a number of seminars for the general public and schools	Residential Promotion and Education · 3Rs promotion and education program, focused on the residential sector · Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · *Promotion/education for source reduction/pre-cycling/composting/reuse/recycling*

TABLE 7.9
LIST OF SYSTEM COMPONENTS

SYSTEM: RESIDENTIAL MIXED SOLID WASTE PROCESSING
(continued)

Generic Components Existing Within the GTA	REGIONS			
	Durham	Metro Toronto	York	Peel
Residential Promotion and Education - continued		· Consumer education program to reduce waste generation, includes videos, posters, calendars, pamphlets, advertisements, etc. · *Promotion/education for source reduction/pre-cycling/composting/ reuse/recycling*	· *Promotion/education program on source reduction/pre-cycling/reuse/ recycling*	

TABLE 7.10

LIST OF IC&I SYSTEM COMPONENTS

GTA IC&I Systems	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
IC&I Collection Dry Wastes	· Voluntary source separation of dry recyclables by some IC&I generators · Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers · Curbside collection of IC&I recyclables in some areas by municipal forces. · IC&I depots at transfer stations for use by small business generators · Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.)	· Voluntary source separation of dry recyclables by some IC&I generators · Mandatory source separation of designated materials by major generators (3Rs regulations). · Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers. · Curbside collection of IC&I recyclables in some areas by municipal forces · IC&I depots at transfer stations for use by small business generators. · Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.)	· Mandatory source separation of designated materials by most IC&I generators in GTA (to capture 90% of total IC&I waste generation) · Voluntary source separation of dry recyclables by small IC&I generators. · Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers · Curbside collection of IC&I recyclables in some areas (City of Toronto, Caledon) by municipal forces · IC&I depots at transfer stations for use by small business generators (Metro Toronto) · Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.)	· Voluntary source separation of dry recyclables by some small IC&I generators · Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers · Curbside collection of IC&I recyclables in some areas (City of Toronto, Caledon) by municipal forces · IC&I depots at transfer stations for use by small business generators (Metro Toronto) · Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.) · Mandatory source separation of expanded list of designated materials by most IC&I generators (revision to 3Rs regulations)	· Voluntary source separation of dry recyclables by some small IC&I generators · Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers · Curbside collection of IC&I recyclables in some areas (City of Toronto, Caledon) by municipalities · IC&I depots at transfer stations for use by small business generators (Metro Toronto) · Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.) · Mandatory source separation of designated materials by most generators (revision to 3Rs regulations)	· Voluntary source separation of dry recyclables by small IC&I generators · Collection of source separated dry recyclables from the IC&I sector by private sector haulers and recyclers · Curbside collection of IC&I recyclables in some areas (City of Toronto, Caledon) by municipal forces · IC&I depots at transfer stations for use by small business generators (Metro Toronto) · Landfill bans on specified materials (e.g. wood, tires, drywall, scrap metal, white goods, fine paper etc.) · Mandatory source separation of designated materials by most generators (revision to 3Rs regulations) · Mandatory processing of all dry wastes prior to landfilling (new policy required by Ontario, or condition on C of A for landfill)
IC&I Collection Wet Wastes	· Voluntary source separation of IC&I wet wastes · Separate collection of IC&I wet wastes	· Voluntary source separation of IC&I generated organics · Separate collection of IC&I wet wastes	· Voluntary source separation of IC&I generated organics · Separate collection of IC&I wet wastes	· Voluntary source separation of IC&I generated organics · Separate collection of IC&I wet wastes	· Mandatory source separation of wet wastes by designed IC&I generators (revision to 3Rs regulations) · Voluntary source separation of IC&I generated organics · Separate collection of IC&I wet wastes	· Voluntary source separation of IC&I generated organics · Separate collection of IC&I wet wastes
IC&I Processing Dry Wastes	· Processing of specific dry materials (e.g. C&D wastes, wood, drywall etc.) in specially designed facilities · Processing centres for a wide range of dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff · Processing of IC&I sector recyclables in municipal MRF's · Processing of IC&I sector recyclables in small private sector recyclers	· Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities · Processing centres for a wide range of dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff · Processing of IC&I sector recyclables in municipal MRF's · Processing of IC&I sector recyclables by small private sector recyclers	· Additional processing capacity for dry recyclables required · Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities · Processing centres for a wide range of dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff · Processing of IC&I sector recyclables in municipal MRFs · Processing of IC&I sector recyclables by small private sector recyclers	· Additional processing for wider list of dry materials required · Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities · Processing centres for dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff · Processing of IC&I sector recyclables in municipal MRFs · Processing of IC&I sector recyclables by small private sector recyclers	· Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities · Processing centres for dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff · Processing of IC&I sector recyclables in municipal MRFs · Processing of IC&I sector recyclables by small private sector recyclers · Additional processing capacity for dry recyclables	· Processing of specific dry materials (e.g. C&D wastes, wood, drywall) in specially designed facilities · Processing centres for dry recyclables collected from the IC&I sector, owned by the private sector and operated by private sector staff · Processing of IC&I sector recyclables in municipal MRFs · Processing of IC&I sector recyclables by small private sector recyclers · Mandatory processing of all dry wastes prior to landfilling (new policy) · Mandatory processing of all mixed wastes prior to landfilling (new policy)

TABLE 7.10

LIST OF IC&I SYSTEM COMPONENTS
(continued)

GTA IC&I Systems	System 1 Existing	System 2 Existing Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
IC&I Processing Wet Wastes	Centralized windrow composting of source separated IC&I organics (e.g. Scotts Farm) On site composting of source separated organics generated by the IC&I sector Centralized composting of IC&I organics in in-vessel system Vermicomposting at some IC&I locations Rendering of food wastes from IC&I sector	Centralized windrow composting of source separated IC&I organics (e.g. Scotts Farm) On site composting of source separated organics generated by the IC&I sector Centralized composting of IC&I organics in in vessel system Vermicomposting at some IC&I locations Rendering of food wastes from IC&I sector	Centralized windrow composting of source-separated IC&I organics (Scotts Farm) On site composting of source separated organics generated by the IC&I sector Centralized composting of IC&I organics in in vessel system Vermi-composting at some IC&I locations Rendering of food wastes from IC&I sector	Centralized windrow composting of source-separated IC&I organics (Scotts Farm) On site composting of source separated organics generated by the IC&I sector Centralized composting of IC&I organics in in vessel system Vermi-composting at some IC&I locations Rendering of food wastes from IC&I sector New composting facility for IC&I organics Composting of IC&I organics in municipal in vessel system	Centralized windrow composting of source-separated IC&I organics (Scotts Farm) On site composting of source separated organics generated by the IC&I sector Centralized composting of IC&I organics in in vessel system Vermi-composting at some IC&I locations Rendering of food wastes from IC&I sector New composting facility for IC&I organics Composting of IC&I organics in municipal in vessel system	Centralized windrow composting of source separated IC&I organics (Scotts Farm) On site composting of source separated organics generated by the IC&I sector Centralized composting of IC&I organics in in vessel system Vermi-composting at some IC&I locations Rendering of food wastes from IC&I sector New composting facility for IC&I organics Composting of IC&I organics in municipal in vessel system
IC&I Reuse	Reuse by IC&I generators through the Canadian, Provincial (e.g. Ontario Waste Exchange) and local waste exchange programs (e.g. Durham) Community based reuse programs for small IC&I generators (WASTEWISE, Halton) Use of food wastes as animal feed Use of food waste for human consumption Landspreading of IC&I organics Refilling of IC&I containers and packaging refillable bottles refillable pails or drums Use of re-usable packaging (e.g. reusable plastic and wood pallets)	Reuse by IC&I generators, through the Canadian, Provincial (e.g. Ontario Waste Exchange) and local waste exchange programs (e.g. Durham) Community based reuse programs for small IC&I generators (WASTEWISE, Halton) Use of food wastes as animal feed Use of food waste for human consumption Landspreading of IC&I organics Use of refillable containers (refillable bottles, refillable pails or drums, etc.) Use of re-usable packaging (e.g. reusable plastic and wood pallets)	Reuse by IC&I generators, through the Canadian, Provincial (e.g. Ontario Waste Exchange) and local waste exchange programs (e.g. Durham) Community based reuse programs for small IC&I generators (WASTEWISE, Halton) Use of food wastes as animal feed Use of food waste for human consumption Landspreading of IC&I organics Use of refillable containers (refillable bottles, refillable pails or drums) Use of re-usable packaging (e.g. reusable plastic and wood pallets)	Reuse by IC&I generators through the Canadian, Provincial (e.g. Ontario Waste Exchange) and local waste exchange programs (e.g. Durham) Community based reuse programs for small IC&I generators (WASTEWISE, Halton) Use of food wastes as animal feed Use of food waste for human consumption Landspreading of IC&I organics Use of refillable containers (refillable bottles, refillable pails or drums) Use of re-usable packaging (e.g. reusable plastic and wood pallets)	Reuse by IC&I generators through the Canadian, Provincial (e.g. Ontario Waste Exchange) and local waste exchange programs (e.g. Durham) Community based reuse programs for small IC&I generators (WASTEWISE, Halton) Increased use of food wastes as animal feed Increased use of food waste for human consumption Increased landspreading of IC&I organics Use of refillable containers such as packaging by businesses (refillable bottles refillable pails or drums, etc.) Use of re-usable packaging (e.g. reusable plastic and wood pallets)	Reuse by IC&I generators through the Canadian, Provincial (e.g. Ontario Waste Exchange) and local waste exchange programs (e.g. Durham) Community based reuse programs for small IC&I generators (WASTEWISE, Halton) Use of food wastes as animal feed Use of food waste for human consumption Landspreading of IC&I organics Use of refillable containers (refillable bottles, refillable pails or drums, etc.) Use of re-usable packaging (e.g. reusable plastic and wood pallets)
IC&I Reduction	Voluntary waste reduction actions by IC&I generators Voluntary reduction of packaging waste by 25% by the year 2000 (NAPP)	Voluntary waste reduction actions by IC&I generators Voluntary reduction of packaging waste by 25% by the year 2000 (NAPP) Mandatory development of waste reduction action plans by major IC&I generators (defined in 3Rs regulations) Mandatory development of packaging reduction action plans by major packaging generators (defined in 3Rs regulations)	Voluntary waste reduction actions by IC&I generators Voluntary reduction of packaging waste by the year 2000 (NAPP) Mandatory development of waste reduction action plans by most IC&I generators (revision to 3Rs regulations) Mandatory development of packaging reduction action plans by major packaging generators (defined in 3Rs regulations)	Voluntary waste reduction actions by small IC&I generators Voluntary reduction of packaging waste by the year 2000 (NAPP) Mandatory development of waste reduction action plans by most IC&I generators (revision to 3Rs regulations) Mandatory development of packaging reduction action plans by major packaging generators (defined in 3Rs regulations)	Voluntary waste reduction actions by small IC&I generators Voluntary reduction of packaging waste by 25% by the year 2000 (NAPP) Mandatory development of waste reduction action plans by most IC&I generators (revision to 3Rs regulations) Mandatory development of packaging reduction action plans by major packaging generators (defined in 3Rs regulations)	Voluntary waste reduction actions by small IC&I generators Voluntary reduction of packaging waste by 25% by the year 2000 (NAPP) Mandatory development of waste reduction action plans by most IC&I generators (revision to 3Rs regulations) Mandatory development of packaging reduction action plans by major packaging generators (defined in 3Rs regulations)

TABLE 7.10

LIST OF IC&I SYSTEM COMPONENTS
(continued)

GTA IC&I Systems	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
IC&I Programs	Voluntary waste audits performed by IC&I generators. Independent voluntary waste reduction programs in private companies. Voluntary packaging reporting by packaging users (NAPP)	Voluntary waste audits performed by IC&I generators Independent voluntary waste reduction programs in private companies Mandatory waste audits by major IC&I generators (3Rs regulations). Mandatory packaging audits by major packaging generators (3Rs regulations) Voluntary packaging reporting by packaging users (NAPP)	Voluntary waste audits performed by small IC&I generators Independent voluntary waste reduction programs in private companies Mandatory waste audits by most IC&I generators (revision to 3Rs regulations) Mandatory packaging audits by major packaging generators (3Rs regulations) Voluntary packaging reporting by packaging users (NAPP)	Voluntary waste audits performed by small IC&I generators Independent voluntary waste reduction programs in private companies Mandatory waste audits by most IC&I generators (revision to 3Rs regulations) Mandatory packaging audits by major packaging generators (3Rs regulations) Voluntary packaging reporting by packaging users (NAPP)	Voluntary waste audits performed by small IC&I generators Independent voluntary waste reduction programs in small private companies Mandatory waste audits by most IC&I generators (revision to 3Rs regulations) Mandatory packaging audits by major packaging generators (3Rs regulations) Voluntary packaging reporting by packaging users (NAPP)	Voluntary waste audits performed by small IC&I generators Independent voluntary waste reduction programs in small private companies Mandatory waste audits by most IC&I generators (revision to 3Rs regulations) Mandatory packaging audits by major packaging generators (3Rs regulations) Voluntary packaging reporting by packaging users (NAPP)
IC&I Promotion and Education	IC&I information hotline (Metro) Promotion/education program focused on reducing waste disposed by the IC&I sector, carried out by the Regional municipality Promotion/education of IC&I waste reduction by non profit organizations (e.g. RCO) Promotion/education of IC&I waste reduction by associations	IC&I information hotline (Metro) Promotion/education program focused on reducing waste disposed by the IC&I sector, carried out by the Regional municipality Promotion/education of IC&I waste reduction by non-profit organizations (e.g. RCO) Promotion/education of IC&I waste reduction by associations and educational facilities Mandatory posting of waste reduction plans for review by employees by major IC&I generators (3Rs regulations).	IC&I information telephone hotline (Metro Toronto) Promotion/education program focused on reducing waste disposed by the IC&I sector, carried out by the Regional municipality Promotion/education of IC&I waste reduction by non-profit organizations (e.g. RCO) Promotion/education of IC&I waste reduction by associations and educational facilities Mandatory posting of waste reduction plans for review by employees by most IC&I generators (revision to 3Rs regulations)	IC&I information telephone hotline (Metro Toronto) Promotion/education program focused on reducing waste disposed by the IC&I sector, carried out by the Regional municipality Promotion/education of IC&I waste reduction by non profit organizations (e.g. RCO) Promotion/education of IC&I waste reduction by associations and educational facilities Mandatory posting of waste reduction plans for review by employees by most IC&I generators (revision to 3Rs regulations)	IC&I information telephone hotline (Metro Toronto) Promotion/education program focused on reducing waste disposed by the IC&I sector, carried out by the Regional municipality Promotion/education of IC&I waste reduction by non profit organizations (e.g. RCO) Promotion/education of IC&I waste reduction by associations and educational facilities Mandatory posting of waste reduction plans for review by employees by most IC&I generators (revision to 3Rs regulations)	IC&I information telephone hotline (Metro Toronto) Promotion/education program focused on reducing waste disposed by the IC&I sector, carried out by the Regional municipality Promotion/education of IC&I waste reduction by non profit organizations (e.g. RCO) Promotion/education of IC&I waste reduction by associations and educational facilities Mandatory posting of waste reduction plans for review by employees by most IC&I generators (revision to 3Rs regulations)

8.0 SYSTEM EVALUATIONS

8.1 Introduction

This chapter presents the net effects analysis undertaken for each of the systems and describes the advantages and disadvantages of the alternative systems for each Region.

8.2 System Net Effects Analysis

Figure 8.1 presents the approach followed in the net effects analysis and evaluation. The following describes the approach followed.

8.2.1 Evaluation Criteria

Based on the study team's understanding of the issues and scope of the study, a set of criteria and indicators was developed as presented in Figure 8.2 and Table 8.1.

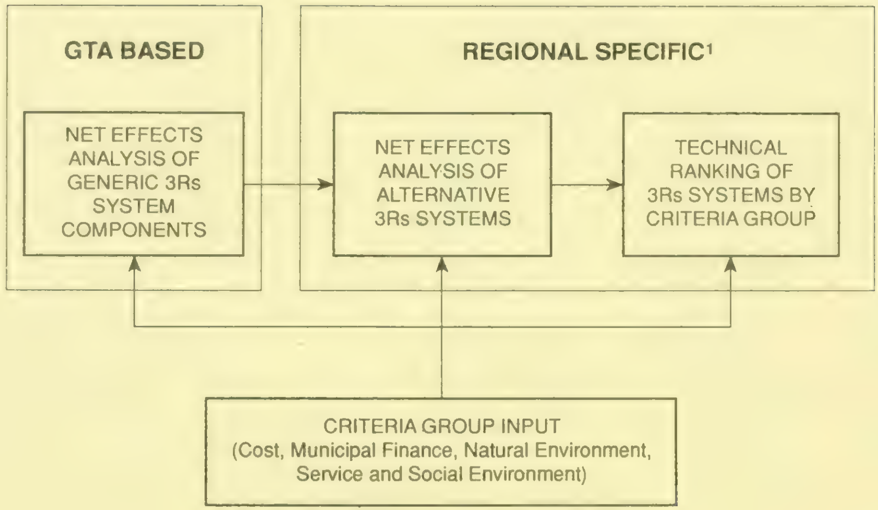
These criteria were categorized under the following criteria groups:

- Cost;
- Municipal Finance;
- Natural Environment;
- Service; and
- Social Environment.

These criteria groups formed the basis of the 3Rs systems evaluations within each Region.

8.2.2 Evaluation Criteria Ranking

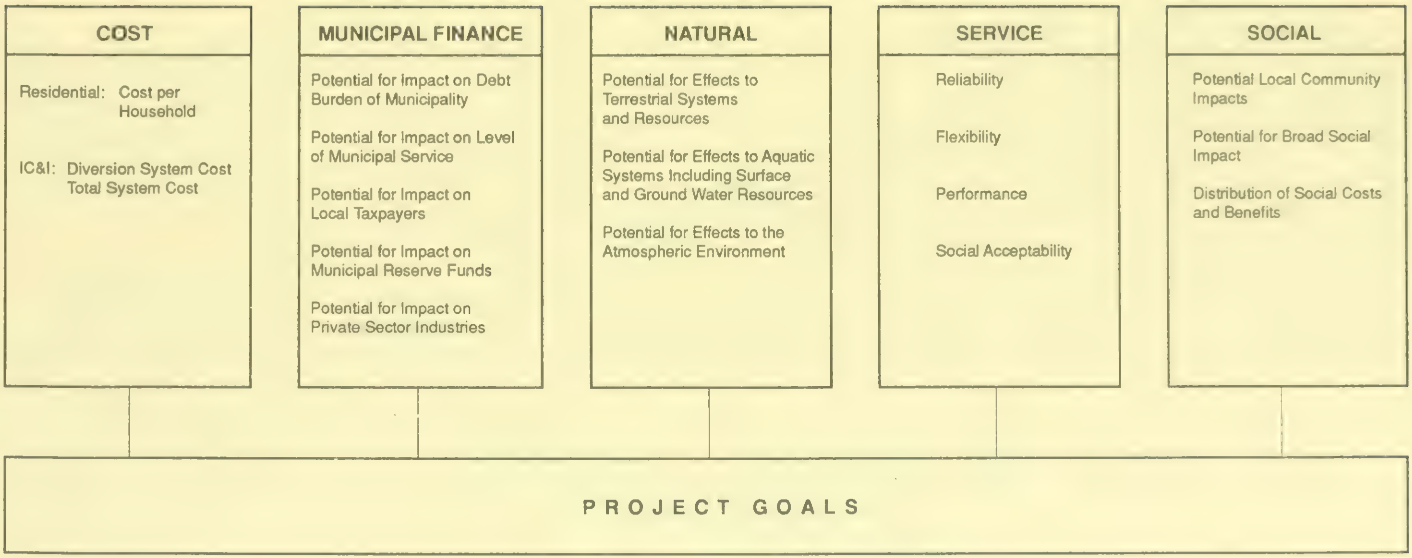
To facilitate the ranking of systems on the basis of each criteria group, the criteria were ranked in terms of their level of importance. The criteria rankings developed within each criteria group were consistent for all 3Rs system rankings in each Region. This was due to the generic nature of the analysis and similarities among the study areas. For example, the type of natural environment effects in Durham would likely be similar to effects in Peel.



1. The IC & I systems were evaluated through the same approach but this was done in the context of the GTA

3Rs SYSTEM NET EFFECTS AND EVALUATION APPROACH

FIGURE 8.1



EVALUATION CRITERIA

FIGURE 8.2

TABLE 8.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I

Criteria Group/Criteria	Indicator	Definition	Rationale
Cost (Residential)			
Cost per Household (system)	· the cost of the waste management system including diversion and disposal on a per household basis	The net cost of the waste management system (diversion and disposal) after systemic revenue sources have been taken into account, divided by the number of households within the Region.	Addressed the goal of minimizing cost.
Cost (IC&I)			
Diversion System Cost	· the cost of the diversion system as expressed as cost per tonne diverted	The net cost of the diversion system divided by the number of tonnes diverted	Addressed the goal of minimizing cost.
Total System Cost	· the cost of the total waste management system (disposal plus diversion)	The net cost of the waste management system (diversion and disposal)	Addressed the goal of minimizing cost.
Municipal Finance			
Potential for Impact on Debt Burden of Municipality	· amount of debenture (long-term) debt · annual debt payments as a percentage of Revenue Fund Expenditures (OMB/MMA Guidelines) · available debt capacity for other municipal purposes (OMB/MMA Guidelines)	The net cost of the 3Rs alternative system, after outside or systematic income sources have been taken into account and when included in municipal budgets are financed by debt instruments or debentures and this added cost must be paid by future local property tax levies.	To avoid an unnecessary debt burden to local residents and allow for other local capital spending practices, the criteria focuses on determining cost effective system alternatives that minimizes debt burdens. This in turn also minimizes future taxes and local changes to be paid by residents. Addressed the goal of minimizing impacts on human communities.

TABLE 8.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I
(Continued)

Criteria Group/Criteria	Indicator	Definition	Rationale
Potential for Impact on Level of Municipal Service	· total municipal wages/salaries, material and contract expenditures expressed as a per household basis · current expenditures for each functional department, net inter-department transfers, transfers to reserves, capital costs and debt charges, expressed on a per household basis	The net cost of the 3Rs alternative system, after outside or systematic revenue sources have been taken into account and when included in municipal budgets are financed by relocations in other service areas.	Paying the same for less service is the same as a cost increase. To avoid an unnecessary debt burden to the local residents and allow for other local capital spending priorities, the criteria focuses on determining cost effective system alternatives that minimizes debt burdens. Addressed the goal of minimizing impacts on human communities.
Potential for Impact on Local Taxpayers	· total increase in the net general municipal levy · net general municipal levy, adjusted for commercial/industrial property assessment, expressed on a per household basis (tax proxy)	The net cost of the 3Rs alternative system, after outside or systematic revenue sources have been taken into account, and when included in municipal budgets and added to local property tax levies or billed directly to residents.	To avoid unnecessary or burdensome cost to the local resident, the criterion focuses on determining cost effective system alternatives that minimizes taxes and local charges. Addressed the goal of minimizing impacts on human communities.
Potential for Impact on Municipal Reserve Funds	· total amount of reserves and reserve funds · Reserves and Reserve Funds expressed on a per household basis · Reserves and Reserve Funds expressed as a percentage of operating expenditures	The net cost of 3Rs alternatives when financed in whole or in part by municipal reserves.	International financing strategies to avoid debt or tax costs decreases the effectiveness of reserve fund financing for other municipal priorities and reduces the municipality's ability to offset unexpected budget expenditures. Addressed the goal of minimizing impacts on human communities.

TABLE 8.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I
(Continued)

Criteria Group/Criteria	Indicator	Definition	Rationale
Potential for Impact on Private Sector Industries	· the total amount of private sector funding applied to each system alternative · the amount of additional private sector costs applied to each system alternative · the amount of additional private sector costs passed on through higher prices · the cost/savings of the system alternative when financed by the private sector through additional taxes, tax incentives, or market/ economic incentives	The net cost of the 3Rs alternative system, after municipal or Provincial funding sources have been taken into account, and when added to private sector costs, including the costs of crown corporations, that may be added to service or product prices and passed on to the consumer.	To avoid unnecessary or burdensome costs being passed on to the private sector from the public sector, the criteria focuses on capturing the potential social effects on consumers while determining the system alternative cost on private sector industries within the GTA. Addressed the goal of minimizing impacts on human communities.
Natural			
Potential for Effects to Terrestrial Systems and Resources	· potential for loss or removal of terrestrial systems and resources · potential for disruption effects to terrestrial systems and resources	This criterion addressed the potential for the loss/removal and disruption to terrestrial systems and resources. This included terrestrial biological systems and forest, mineral and agriculture resources.	Addressed the goal of minimizing impacts on natural environment.
Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources	· potential for loss or removal of aquatic systems including surface water resources · potential for disruption effects to aquatic systems including surface and ground water resources	This criterion addressed potential for the loss/removal and disruption to aquatic systems and resources. This included aquatic biological systems and surface water and ground water resources.	Addressed the goal of minimizing impacts on natural environment.
Potential for Effects to the Atmospheric Environment	· potential for atmospheric emissions	This criterion addressed the potential for effects to the atmospheric environments. This involves effects due to emissions such as gases, odour and dust.	Addressed the goal of minimizing impacts on natural environment.

TABLE 8.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I
(Continued)

Criteria Group/Criteria	Indicator	Definition	Rationale
Service			
Reliability	· proven technology(ies) based on experience in other jurisdictions · degree of reliance on single approach	This criterion addressed the reliability of the alternatives in terms of providing a continuous service and achieving the service.	To ensure an ongoing level of service, the selected systems must have a proven level of reliability. Addressed the goal of maximizing service.
Flexibility	· types and range of quantities accepted · compatibility with Existing system	This criterion addressed the ability of the system of accommodate variable waste quantities and characteristics.	A preferable system would be one which can adapt to changing waste quantities and compositions and be integrated with existing facilities. Addressed the goal of maximizing service.
Performance	· quantity diverted or requiring landfilling	This criterion addressed the reduction in quantity of waste requiring disposal and the need for additional management of waste resulting from the application of the alternative.	This criterion addressed the goal of maximizing service by maximizing the quality of waste diverted from landfilling.
Social Acceptability	· participation in 3Rs (current and future) by: - individuals - municipalities - IC&I sector - special/sensitive groups · attitudes and perceptions toward 3Rs activities · willingness to pay	This factor addressed the likelihood of success of an alternative based on current reasons for patterns of participation and on changing attitudes and perceptions toward 3Rs activities over the time horizon of the study. Social acceptance was considered on a Regional and GTA level.	The public, municipalities and the IC&I sector must accept the 3Rs system for it to become fully operational. Preferable systems are those that have a high potential for being socially acceptable. The criterion provided input to the level of service provided by the systems based on potential behaviour or social response. Addressed the goal of maximizing service in terms of waste diversion.

TABLE 8.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I
(Continued)

Criteria Group/Criteria	Indicator	Definition	Rationale
Social			
Potential Local Community Impacts	· potential effects on residents · potential effects on special/sensitive groups · potential effects on communities · potential effects on community features	Projects, programs and processes could lead to positive and negative changes in the lives of people and their communities. Some components of the system, particularly facilities, could create negative impacts on nearby communities, people and businesses. This criterion measured the effect of change on individuals, groups of people and communities. The alternative systems were compared on the basis of the potential effects on residents, communities, community features and businesses.	Some of the 3Rs systems contained public or private facilities, programs and processes which may create local community/ neighbourhood impacts. Other programs, while leading to environmental benefit and social responsibility, may be considered by some to be disruptive to their day-to-day activities. Addressed the goal of minimizing impacts on human communities.

TABLE 8.1

GTA 3Rs ANALYSIS
ALTERNATIVE SYSTEM EVALUATION CRITERIA
RESIDENTIAL AND IC&I
(Continued)

Criteria Group/Criteria	Indicator	Definition	Rationale
Potential for Broad Social Impact	· potential for lifestyle changes · potential effect on employment · potential effect on economic development · potential operational effects on institutions, commercial enterprises and industry	This criterion focused on Regional employment, economic and lifestyle changes provided by the 3Rs systems. Changes may be required or may occur in the way residents, government, industry, institutions and agencies behave with respect to the 3Rs. The alternative systems were compared on the basis of employment and economic development effects, their associated economic and institutional barriers and opportunities, and the effects on the broader social character.	Broad social impact considerations addressed the potential positive and negative effects. The 3Rs system may affect the way institutions and businesses behave. And, the behaviour of government, industry, agencies and associations can affect the level and type of 3Rs service possible. Each 3Rs system is likely to have direct and/or indirect effects on employment, economic development and lifestyle. Systems which promote changes in lifestyle which support or encourage greater longer term reduction, reuse and recycling and greater diversion of wastes are preferred. Addressed the goal of minimizing impacts on human communities.
Distribution of Social Costs and Benefits	· distribution of socio-economic effects on industry and population groups · distribution of lifestyle effects · potential future generation effects of system	This criterion considered the distribution of social costs and benefits of the alternative 3Rs systems among population groups and generations. Various system alternatives granted different levels of benefits to specific businesses and user groups, while introducing different levels of negative effect on others. The alternative systems were evaluated on the basis of the types of social costs and benefits that may occur and who may be affected.	The social costs and benefits of the alternative 3Rs systems were evaluated to determine if certain groups bear a greater share of the social costs. It is preferable that those who bear the costs also share equitably in the benefits. The social costs and benefits to future generations were addressed. Addressed the goal of minimizing impacts on human communities.

The criteria within each criteria group were ranked by the study team members responsible for them (i.e. the Social criteria were ranked by the Social discipline).

The following were taken into consideration when ranking criteria:

- The magnitude of effects, (i.e. the actual potential level of net effects that are possible for the range of systems considered). For example, could the highest system cost levels be a significant burden to the municipality or are they all well within normal expenditure levels?

- The duration of effects, (i.e. are effects expected to be during construction (short-term) or during operation (long-term)?

- The significance of effects, (i.e. are effects significant in a Regional or provincial policy context?)

- The certainty of effects, (i.e. will effects definitely occur or are they intermittent or unlikely?)

- The relative difference among options, if a criterion or criteria group shows no difference among options, it cannot be used to compare systems.

The following discusses the criteria ranking rationale within each of the criteria groups.

8.2.2.1 Cost Criteria Group Criteria Ranking

As the Cost Criteria Group for the residential systems only had one criterion (cost per household (system)), criteria ranking within this grouping was not required.

For IC&I system evaluation, two Cost criteria were considered: 1) Diversion System Cost and 2) Total System Cost. The total cost for the waste management system was considered the more important criterion, as it provided a measure of how different diversion systems compare when all waste management factors were taken into account. If total system costs were not included as an indicator, the financial and cost benefits of the waste diversion systems would not be fully considered. Therefore, the analysis provided an unbalanced view of the likely financial and cost impacts of each of the six IC&I waste diversion systems.

The cost per tonne of the diversion system was considered less important, but it was valuable in comparing the efficiencies of different approaches to waste diversion from a cost point of view. Systems with a very high cost per tonne diverted were considered less favourable than systems with a low cost per tonne diverted.

The Cost criteria were different for residential and IC&I systems because of the different nature of the residential and IC&I sectors. Household waste generation, the focus of residential waste management system is not relevant to the IC&I sector. Also, IC&I establishments, the comparable element of the IC&I sector, do not generate as uniform a range of waste materials as is generated by the residential sector.

8.2.2.2 Natural Environment Criteria Group Criteria Ranking

The Natural Environment Criteria Group contained three criteria. Two categories of importance were identified for the Natural Environment Criteria Group. The criteria "potential for effects to aquatic systems including surface water and ground water resources" and "potential for effects to atmospheric environment" were considered to be equal and the most important. These two criteria were given the highest ranking since potential effects from the 3Rs systems may result in significant loss/removal or disruption of aquatic systems and resources, and exceed established regulatory standards with respect to discharges of contaminants to the atmosphere. The duration of these potential effects may also be throughout the life of the alternative. However, the occurrence of the effects is expected to be intermittent and any effects may be reduced by the mitigative measures.

The criterion "potential for effects to terrestrial systems and resources" was ranked lowest since the magnitude of any effects possible from an alternative system are not expected to result in the significant loss/removal or disruption of terrestrial systems and resources. The potential effects which may occur are expected to occur during the short-term. There is also a high potential to mitigate any effects that are predicted to occur.

The criteria ranking for the Natural Environment Criteria Group and the rationale for the ranking is provided in Table 8.2.

TABLE 8.2
NATURAL ENVIRONMENT CRITERIA GROUP
CRITERIA RANKING

NATURAL ENVIRONMENT		
Criterion	**Rank Order[1]**	**Rationale**
Criterion 1		
Potential for effects to terrestrial systems and resources	3	This criterion is ranked the lowest since the magnitude of effects possible for the range of systems are expected to be within accepted standards. Most effects are unlikely to occur or are expected to occur during the short-term. There is a high potential to mitigate any potential effects by proper siting of new facilities.
Criterion 2		
Potential for effects to aquatic systems including surface water and ground water resources	1	This criterion is ranked the highest since potential effects may be significant exceeding accepted standards. Potential effects may occur throughout the life of the option. The occurrence of the effects is expected to be intermittent. Mitigative measures may reduce effects but will not eliminate them.
Criterion 3		
Potential for effects to atmospheric environment	1	This criterion is ranked the highest since potential effects may be significant exceeding accepted standards. Potential effects may occur throughout the life of the option. The occurrence of the effects is expected to be intermittent. Mitigative measures may reduce effects but will not eliminate them.

1. A ranking of "1" is to represent the criterion considered to be the most important.

8.2.2.3 Municipal Finance Criteria Group Criteria Ranking

The Municipal Finance Criteria Group were ranked equally important as no one criterion was determined to be more important than the others in assessing municipal finance impacts.

8.2.2.4 Social Environment Criteria Group Criteria Ranking

The Social Environment Criteria Group contained three criteria:

- Potential Local Community Impact;
- Potential for Broad Social Impacts; and
- Distribution of Social Costs and Benefits.

The conclusion of the ranking process was that, without public input, no single criterion could be determined to be more important than the others. The degree of certainty of the predicted net effects was considered to be the same for each criterion. As a result, different categories of importance did not emerge from the process and all three criteria were given the same ranking.

8.2.2.5 Service Criteria Group Criteria Ranking

The Service Criteria Group contained four criteria. These were:

- Reliability;
- Flexibility;
- Performance; and
- Social Acceptability.

Performance and reliability are considered to be of greatest and equal importance for the Service Criteria Group. Performance measures the amount of waste diversion (tonnages diverted expressed as a percentage of waste generation). Reliability measures whether systems are likely to work (due to technology and operational factors) and whether the system as a whole is vulnerable to break-down.

These two criteria are given the highest ranking since, when considered together, they provide the strongest and most reliable indicators of whether any significant measure of waste diversion has been or is likely to be achieved. These two criteria provide the best

means of assessing the significance, certainty, and magnitude of effects, and highlight the difference among options.

The criterion social acceptability was ranked second in importance. This criterion measures whether the public is likely to reject or accept a system. It provides an indicator of whether residents will participate in source separation and other programs that are fundamental to ensuring diversion performance. This criterion is helpful in evaluating the certainty and duration of effects.

Flexibility was ranked lowest in importance since it is not very helpful in determining the magnitude of differences between the duration, certainty or significance of effects. This criterion evaluates systems according to the type and quantities of waste accepted and system compatibility with the existing or Existing/Committed system. The logic behind such a criterion is that systems which are proven to be incapable of expansion or that demand significant alteration of Existing systems are likely to be faced with greater challenges in terms of ensuring public participation. However, some systems which are not compatible with the Existing system have significant benefits in other areas, and should not be discounted due to lack of flexibility.

Each criterion was evaluated with consideration of existing situations and potential for change. The criteria rankings for the Service Criteria Group are presented in Table 8.3.

The Service Criteria Group for the IC&I systems evaluation were ranked differently as outlined in Table 8.4. In the case of IC&I systems reliability, performance and social acceptability are all considered equally important. The rationale for this slight difference is summarized in Table 8.4.

8.2.3 Net Effects Analysis and Assumptions

Based on the descriptions of the Regionally-based 3Rs systems and the criteria developed by the study team, a net effects analysis was undertaken for each individual component contained within each system. This net effects analysis was not specific to Regional conditions, rather it generically developed the effects and mitigation associated with the components of each system in the context of the larger GTA. Recognizing the amount of overlap among the alternative systems, this approach was undertaken to reduce the number of net effects tables which would be either the same or very similar. Although the components were organized by each of the developed alternative systems, the GTA-based generic net effects were not summarized at the system level. Rather, the net effects were only developed for each of the component categories listed within each alternative system.

TABLE 8.3
SERVICE CRITERIA GROUP CRITERIA RANKING
RESIDENTIAL SYSTEMS

DISCIPLINE		
Criterion	**Rank Order[1]**	**Rationale**
Criterion 1		
Reliability	1	This criterion was ranked highest as the reliability of a waste diversion system is considered of major significance, and was a reliable measure for distinguishing between different systems. Also, the level of confidence with which diversion of a system can be estimated was an important factor in the final choice.
Criterion 2		
Flexibility	3	Flexibility was ranked least important in the service group, as it is not an essential feature for a waste diversion system.
Criterion 3		
Performance	1	Performance was considered the most important criterion within the service group, as it measures how effective a waste diversion system will be. If performance is not reasonable, then a diversion system should be eliminated from serious consideration.
Criterion 4		
Social Acceptability	2	Social acceptability was ranked second in importance in the service grouping as it should not be considered a significant factor in the choice of a system; many waste diversion systems become socially acceptable over time.

1. A ranking of "1" is to represent the criterion considered to be the most important.

TABLE 8.4
SERVICE CRITERIA GROUP CRITERIA RANKING
GREATER TORONTO AREA IC&I SYSTEMS

DISCIPLINE		
Criterion	**Rank Order[1]**	**Rationale**
Criterion 1		
Reliability	1	Reliability was ranked one of the most important criteria since reliability of a waste diversion system affects performance and participation. The major distinguishing feature among systems is the extent to which technologies used or required are proven.
Criterion 2		
Flexibility	2	Flexibility addresses the range and quantity of wastes processed, and compatibility with the Existing system. Flexibility was ranked as the least important criterion in the Service Criteria Group as it is not an essential feature of the IC&I waste management system.
Criterion 3		
Performance	1	Performance was considered one of the most important criteria within the Service Criteria Group, as it measures how effective a waste diversion system will be. If performance is not sufficient, then a diversion system doe snot meet its basic objective.
Criterion 4		
Social Acceptability	1	Social acceptability was considered as one of the most important criteria in the Service Criteria Group for IC&I systems, as it attempts to measure the burden imposed on individual firms by the different systems, and the extent to which they will respond, and participate in more stringent regulatory or cost requirements. It assists in distinguishing between systems, as those which do not expect reasonable participation will be unable to achieve high diversion levels.

1. A ranking of "1" is to represent the criterion considered to be the most important.

The component categories served as groupings of similar components. It should be noted that GTA based generic net effect tables were not generated for the Cost and Municipal Finance Criteria Groupings as it was not possible to generically assess potential impacts for these two groupings.

The components and their net effects were then recombined into the Regionally-based 3Rs systems to create the net effects analysis for each residential 3Rs system for each Region. The process of converting the component net effects to the Regionally-based system net effects involved first reviewing the components which are in each of the specific Regional systems and then identifying any changes to the net effects information as a result of Regionally specific data. Each discipline then aggregated its component category net effects by indicator into system net effects by indicator.

In developing the net effects, general mitigation and enhancement measures were developed for the types of potential effects identified to avoid, eliminate or minimize negative effects and, where feasible, to enhance the positive effects. These measures were assumed to be implemented by the appropriate party(ies).

In undertaking the net effects analysis, a number of assumptions were recognized which are outlined below. Assumptions specific to the individual criteria groups are presented in each of the technical appendices.

System Net Effects Assessment

- Throughout the net effects evaluation highest ranked denotes the lowest system impact for that criterion or criteria group and lowest ranked denotes the highest system impact.

- In assessing the effects of a facility (either Existing or proposed) located outside of the Region which owns/uses it, the effects are attributed to the Region which owns/uses it, not to the Region within which the facility is located.

- Specific sites/locations for new facilities were not known.

- The Existing 3Rs systems were analyzed at the same level of detail as the other systems.

- Waste export for disposal equates to local disposal requirements and does not count as diversion through 3Rs.

- Waste regulations identified in the IC&I systems were assumed to be applied equally throughout the province.

- Markets were assumed to be available for the diverted wastes generated by all 3Rs systems.

- That a site selection exercise would be undertaken to locate the larger facilities to minimize impacts.

- That facilities would be located (where possible) in areas which were most compatible with their character (i.e. locating MRFs in industrial designated areas).

- Only effects directly attributed to a 3Rs component or system were identified, i.e. secondary or indirect effects were not recognized. The rationale that due to the generic level of analysis and the number of "unknowns", indirect effects (such as decrease in volume of forests being logged due to more paper recycling) could not be accurately assessed.

- That mitigation measures would be readily available such as the installation of design features to prevent or restrict discharges to the environment, and implementing contingency measures in the event of an accident.

- 3Rs components would be developed in a manner that fulfils the necessary MOEE approvals (e.g. Certificate of Approval).

- The Regional municipalities will ultimately decide which system or systems will be implemented based on an understanding of local issues, operations, etc.

Diversion Estimates

- The diversion rate estimates are based on 1987 generation rates and apply to any year after 1995 assuming the system is fully operational.

- The Regions of Metro Toronto and York were only combined for the purpose of determining the combined overall rate of diversion for these two Regional Municipalities. Alternative systems were developed and ranked separately for these two Regions

- To determine whether the 50% Provincial diversion target is reasonable for planning purposes, diversion estimates are projected to the year 2000. This is consistent with the IWA as they have used the year 2000 as their benchmark year for landfill sizing.

8.3 Systems Evaluation

8.3.1 Durham Region Systems Evaluation

8.3.1.1 Cost Criteria Group (Durham Region)

The following discusses system evaluation for the Cost Criteria Group. The Cost Criteria Group contains only one criterion, which is the cost per household for the waste management system (diversion and disposal). The indicator was based on the costs of the waste diversion system and the waste disposal system (in $/year), using 1992 dollars and dividing the sum of the costs by the total number of households in each Region. The indicator is estimated for all systems using 1992 waste quantity estimates and unit rates. This allows direct comparison of different systems. It provided a measure of how different diversion systems compare, when all waste management factors are taken into account.

A number of diversion system cost indicators (e.g. cost/hh/year for the diversion system, costs/tonne diverted, etc.) were considered but were found to be of little value unless system costs were considered.

Cost Criteria Group - Overall System Ranking

Systems 1 to 5 have system costs (measured as costs/household/year) in the range of $105 to $112 household/year at low disposal rates and $132 to $140/household/year at higher disposal rates. Within the accuracy level of this study, costs within these ranges are considered equal. System 6 (Mixed Waste Processing), has overall system costs of $171 to $176/household/year, if the Mixed Waste Processing system produces high quality compost, and $178 to $193/household/year if the system produces a low quality compost (i.e. greater quantities of material from the mixed waste plant are landfilled due to product quality limitations). It also had significantly higher costs per tonne diverted, and higher diversion costs per household than the other systems. The higher overall costs of this system, whether low quality or high quality compost are produced, are related to the high capital costs involved, and the on-going high operating costs.

Table 8.5 presents the Durham 3Rs system rankings for the Cost Criteria Grouping which are also summarized as follows (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 3 (Direct Cost)
1 - System 4 (Expanded Blue Box)
1 - System 5 (Wet/Dry)
6 - System 6B (Mixed Waste Processing [high quality compost])
7 - System 6A (Mixed Waste Processing [low quality compost])

8.3.1.2 Municipal Finance Criteria Group (Durham Region)

The following discusses the Durham Region systems rankings for the Municipal Finance Criteria Group. System rankings are first discussed by criterion, then for the overall criteria group. It should be noted that the Municipal Finance Criteria Group examined two Direct Cost system scenarios, revenue neutral[1] and added revenue[2].

Potential for Impacts on Local Taxpayers

The following describes the system net effects on the local tax payer taking into account both additional tax levy and the household tax effect. As outlined in Table 8.6, the Existing and Direct Cost (revenue neutral) system have the lowest tax levy ($9) and tax per household increase and are the highest ranked systems. System 2 (Existing/ Committed) has a slightly higher tax levy ($11). The Existing/Committed system was followed by System 4 (Expanded Blue Box) and System 3B (Direct Cost - added revenue) which were third and fourth highest ranked. System 6B (Mixed Waste Processing -

[1] Under the Direct Cost (revenue neutral) system, no additional revenue would be charged for waste and diversion collection purposes from the homeowners beyond what is now collected via municipal taxes.

[2] Under the Direct Cost (added revenue) system, garbage bag chargees would be levied in addition to normal property taxes that include waste diversion and disposal collection costs.

TABLE 8.5

DURHAM REGION
NET EFFECTS SUMMARY FOR COST

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
IMPACT							
Cost (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Lowest ranked	Secont lowest ranked
Cost per household (system)	· $105 to $140/hh/yr	· $104 to $139/hh/yr	· $106 to $132/hh/yr	· $112 to $135/hh/yr	· $115 to $133/hh/yr	· $178 to $193/hh/yr	· $171 to $176/hh/yr

DURHAM REGION
NET EFFECTS SUMMARY FOR MUNICIPAL FINANCE

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3A Direct Cost (revenue neutral)[1]	System 3B Direct Cost (added revenue)[2]	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste (low quality compost)	System 6B Mixed Waste (high quality compost)
Municipal Finance (Overall Ranking)	Highest ranked	Second highest ranked	Highest ranked	Highest ranked	Third highest ranked	Third lowest ranked	Lowest ranked	Second lowest ranked
Impact on Local Taxpayers	Highest ranked due to:	Second highest ranked due to:	Highest ranked due to:	Fourth highest ranked due to:	Third highest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:	Third lowest ranked due to:
· Tax levy ($)	· 2,094,865	· 2,608,692	· 2,008,381	· 5,511,435	· 3,746,534	· 8,245,746	· 10,434,455	· 6,984,455
· Tax per household ($)	· 9	· 11	· 9	· 19	· 14	· 27	· 33	· 23
· Increase in taxation (%)	· 1%	· 1%	· 1%	· 2%	· 1%	· 3%	· 3%	· 2%
Impact on Municipal Debt Burden	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Third highest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Amount of debt ($)	· 0	· 3,856	· 3,856	· 3,856	· 9,000	· 39,500	· 50,000	· 50,000
· Debt payments ($)	· 0	· 601	· 601	· 604	· 1,402	· 6,155	· 7,791	· 7,791
· Debt capacity (%)	· 90%	· 89%	· 89%	· 89%	· 88%	· 80%	· 77%	· 77%
Impact on Municipal Reserves	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Total reserves ($)	· 0	· 0	· 0	· 1,500,000	· 0	· 0	· 0	· 0
· Reserves/ household($)	· 0	· 0	· 0	· 11	· 0	· 0	· 0	· 0
· Reserves/expenses (%)	· 0%	· 0%	· 0%	· 3%%	· 0%	· 0%	· 0%	· 0%
Impact on Municipal Level of Service								
· Operating cost ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Expense/household ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
Impact on Private Sector Industries	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Private funding ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Costs ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Higher prices ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Private taxes (%)	· 1%	· 2%	· 1%	· 1%	· 3%	· 6%	· 7%	· 5%

1. Under the Direct Cost (revenue neutral) system, no additional revenue would be charged for waste and diversion collection purposes from the homeowners beyond what is now collected via municipal taxes.

2. Under the Direct Cost (added revenue) system, garbage bag chargees would be levied in addition to normal property taxes that include waste diversion and disposal collection costs.

high quality compost) was ranked third lowest with a tax increase per household of $23. System 5 (Wet/Dry) which has a tax increase per household of $27 was ranked second lowest. System 6A (Mixed Waste Processing - low quality compost) was the lowest ranked as it would result in the greatest household tax increase ($33).

Potential for Impact on the Debt Burden of the Municipality

The effects of the diversion commitments on the municipal capital programs were more significant than the tax impact. In this analysis, the full capital cost of future diversion commitments were annualized at 9% for a 10 year period.

On an overall basis, when all of the debt factors were combined, System 1 (Existing) represented the highest ranked as it carried no additional capital costs. On the other hand, System 6 (A+B) (Mixed Waste Processing) were the lowest ranked since they incurred the greatest capital costs. System 2 (Existing/Committed) and System 3 (A+B) (Direct Cost) were the second highest ranked systems, and, although they carry some capital costs they did not have a significant effect on Durham Region's financial position. System 4 (Expanded Blue Box) was the third highest ranked system followed by System 5 (Wet/Dry) which represented the second lowest ranked.

Potential Effect on Municipal Reserve Funds

Since no system represented a significantly large impact on household tax levels in Durham Region, it was assumed that reserve funds would not have to be drawn upon to offset costs. Therefore, none of the systems affect reserve funds. While debt levels for System 5 (Wet/Dry) and System 6 (A+B) (Mixed Waste Processing) were large and may potentially require reserve fund contributions, the effect on debt charges and taxes remained relatively low without funding allocations.

System 3B (Direct Cost) was the highest ranked since it added $1.5 million to the Region's reserve fund position. Conversely, the remaining systems were ranked lowest because they did not affect the reserve fund.

Potential for Impact on the Level of Municipal Services

Similar to the evaluation of reserve funds, the annualized cost effect of the diversion systems had a relatively nominal impact on household taxation. Therefore, no reductions in the delivery of service for other municipal departments is necessary to fund diversion costs. Therefore, there would be no impact on the functional service levels in the municipalities.

Potential for Impact on Private Sector Industries

Assuming that residential waste diversion will be paid for through taxes or other public funding sources, the effects analysis did not consider any direct impacts to the private sector to offset costs related to the diversion commitment. However, there is an indirect taxation effect whereby a portion of the diversion cost would be levied in local taxes.

While taxes currently collected from the business sector now approach $57 million, tax charges for each system ranged from 1% for the System 1 (Existing) and System 3 (A+B) (Direct Cost) (added revenue bag charges are only residentially related) to 6% for System 5 (Wet/Dry) and 7% and 5% for System 6 (A+B) (Mixed Waste Processing).

As a result, System 1 (Existing), System 2 (Existing/Committed) and System 3 (A+B) (Direct Cost) are the highest ranked. System 4 (Expanded Blue Box) represented the second highest ranked system. Conversely, System 6 (A+B) (Mixed Waste Processing) and System 5 (Wet/Dry) respectively were the lowest ranked systems.

Municipal Finance Criteria Group - Overall System Ranking

The highest ranked systems in terms of Municipal Finance were System 1 (Existing) and System 3 (A+B) (Direct Cost). The Existing system represented the least cost to the tax payers in Durham Region and did not present any additional debt costs. While the Direct Cost system represented very different revenue strategies the overall ranking indicated the system relative merits. On one hand, System 3A (Direct Cost - revenue neutral) imposes a low cost per household and does not require significant capital costs. On the other hand, while System 3B (Direct Cost - added revenue) did not represent additional significant capital costs, it imposed a cost to the tax payers. This revenue, however, represented an addition to Durham Region's reserves. Therefore, these funds are then available to assist in further waste management financing for other needed projects. As such, these added funds would be returned to Durham Region's tax payers in the future.

Since these added charges were collected as a charge for waste management, it is suggested that the funds be earmarked and used only for waste management purposes and not to decrease general levy requirements for other municipal services.

System 2 (Existing/Committed) and System 4 (Expanded Blue Box) were second and third highest ranked as the tax requirements and debt burdens did not represent significant effects.

System 6A (Mixed Waste Processing) system was the lowest ranked because it represented the highest tax effects and also the highest capital cost. Similarly, while less burdensome, System 6B (Mixed Waste Processing) and System 5 (Wet/Dry) also represented lower ranked systems (second and third lowest ranked) for debt capacity reasons.

To confirm this ranking, the Municipal Finance component also undertook a sensitivity analysis on the key variables that may have affected the criteria indicators. This analysis is presented in the Municipal Finance Technical Appendix. The sensitivity analysis examined variations in capital costs (plus or minus 10% and 20%), rates of waste diversion (plus or minus 5%), variations in operating cost (plus or minus 5% and 10%) differences in waste disposal costs per tonne including the rate Metro Toronto currently charges Durham Region for solid waste disposal and, finally, household growth including a no-growth scenario. While changing the value of the indicators shown above, the sensitivity analysis shows that, given the ranges tested, the general ranking of the systems shown above would not significantly change.

The following summarizes the Durham 3Rs system ranking on the basis of Municipal Finance (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 3A (Direct Cost [revenue neutral])
1 - System 3B (Direct Cost [added revenue])
4 - System 2 (Existing/Committed)
5 - System 4 (Expanded Blue Box)
6 - System 5 (Wet/Dry)
7 - System 6B (Mixed Waste Processing [high quality compost])
8 - System 6A (Mixed Waste Processing [low quality compost])

8.3.1.3 Natural Environment Criteria Group (Durham Region)

The system rankings for the three natural environment criteria are discussed below. The system rankings, by criterion, are summarized in Table 8.7.

For the purpose of the systems evaluation with respect to the natural environment, Systems 6A and 6B were considered to be the same. These system evaluations were combined and are referred to as System 6 (Mixed Waste Processing).

Potential for Effects to Terrestrial Systems and Resources

Effects to terrestrial systems and resources were predicted to occur as a result of siting new 3Rs facilities and due to accidental discharges of wastes or potentially harmful materials as a result of some accident or upset condition. The potential effects due to accidents was expected to be the same for all systems. System 1 (Existing) and System 2 (Existing/Committed) have all the necessary facilities in place. The required expansion or improvements to existing facilities for System 2 (Existing/Committed) was not expected to result in the loss/removal or disruption of terrestrial systems and resources. These two systems were considered equal and highest ranked. System 3 (Direct Cost) did not require any new facilities. However, under this system there was a higher likelihood of illegal dumping of wastes occurring, making it lower ranked than Systems 1 and 2 (Existing/Existing Committed). Systems 4, 5, and 6 (Expanded Blue Box, Wet/Dry and Mixed Waste) all require expanded or additional facilities to those which already exist. It was expected that potential effects to terrestrial systems and resources could be effectively mitigated. This included the siting of new facilities in areas with compatible land uses (i.e. industrial zoned areas). System 4 (Expanded Blue Box) required a single new MRF and was ranked second. Similarly, System 6 (Mixed Waste Processing) required a new Mixed Waste Processing and compost facility at one location. This system was also ranked second lowest since only one new facility was required. The System 5 (Wet/Dry) was lowest ranked since a new MRF and new compost facilities would be required. This system had the highest potential for the loss/removal or disruption of terrestrial systems 47 and resources.

TABLE 8.7

DURHAM REGION
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
IMPACT						
Natural Environment (Overall Ranking)	Highest ranked with System 2	Highest ranked with System 1	Third lowest ranked	Third highest ranked.	Second lowest ranked	Lowest ranked
Potential for effects to terrestrial systems and resources	Highest ranked due to: · necessary facilities already existing · potential effects are due to accidents	Highest ranked due to: · necessary facilities already exist · potential effects are due to accidents	Third highest ranked due to: · necessary facilities already exist · potential effects are due to accidents · illegal dumping of wastes is anticipated and may result in effects	Second lowest ranked due to: · potential effects due to siting new MRF · potential effects due to accidents	Lowest ranked due to: · potential effects due to siting of new MRF and new compost facilities · potential effects due to accidents	Second lowest ranked preferred due to: · potential effects due to siting new mixed waste processing and composting facility · potential effects due to accidents
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities	Highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities	Third highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities · illegal dumping of wastes is anticipated and may result in effects	Third highest ranked due to: · potential effects due to discharge from existing facilities · potential effects due to siting new MRF but no additional discharges	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting new MRF and compost facilities and discharges from new compost facility	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting mixed waste processing/composting facility and discharges from new facility

TABLE 8.7

DURHAM REGION
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Potential for effects to the atmospheric environment	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Second lowest ranked due to: · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases · additional emissions from wet waste composting dependent on compost process	Lowest ranked due to: · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases · additional emissions from mixed waste processing and composting

Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

Potential effects to aquatic systems were expected to occur for reasons similar to effects on terrestrial systems and resources (i.e. location of facility, discharges from the facility, accidents). However, additional effects to aquatic systems may occur due to discharges from 3Rs facilities. These discharges were expected to be in the form of leachate or contaminated surface water runoff from central compost facilities. The potential for effects due to discharges from existing 3Rs facilities was considered to be equal for all systems. Since the necessary facilities already exist for Systems 1 and 2 (Existing, Existing/Committed), these systems were considered equal and highest ranked. No additional effects were expected due to the expansion of the existing MRF in System 2 (Existing/Committed). System 4 (Expanded Blue Box) was ranked third highest, ahead of System 3 (Direct Cost). System 4 (Expanded Blue Box) required a new MRF but no new discharges were expected since only dry recyclable materials were processed. System 3 (Direct Cost) does not require a new facility but under this system there is a higher likelihood of illegal dumping of wastes occurring. This dumping of wastes and its potential effects on aquatic systems make it lower ranked. Systems 5 and 6 (Wet/Dry, Mixed Waste Processing) were considered equal and ranked lowest. Both systems require new 3Rs facilities, including central compost facilities. The potential effects on aquatic systems from these new facilities were expected to be greater than any other system.

Potential for Effects to the Atmospheric Environment

All six system alternatives were expected to have emissions to the atmosphere. These emissions included dust, odours, and gases generated at MRFs and compost facilities, with dust and exhaust emissions generated by waste collection vehicles. There was no differentiation between systems based on these emissions. Emissions to the atmosphere could be reduced by such measures as following proper operating procedures at the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. The potential for effects to the atmospheric environment from emissions was expected to be greater if wet waste (household organic) or mixed waste was being processed and/or composted at centralized facilities in large volumes. System 1 to 4 (Existing, Existing/Committed, Direct Cost, Expanded Blue Box) did not include the management of wet waste or mixed waste. These four systems were considered equal and highest ranked. System 5 (Wet/Dry) included the composting of wet waste while System 6 (Mixed Waste Processing) included mixed waste processing and composting. Due to the different nature of the two processes, with wet waste composting likely to be done using in-vessel technology and mixed waste processing being open to the atmosphere

(i.e. windrow technology), the potential effects of System 6 (Mixed Waste Processing) were considered to be the greatest and the system was considered lowest ranked.

Natural Environment Criteria Group - Overall System Ranking

By considering the comparative ranking of systems by criterion and the criteria rankings together, an overall system ranking was completed for the Natural Environment Criteria Group for Durham Region. The System 1 (Existing) and System 2 (Existing/Committed) systems were ranked highest for each of the three criteria. As a result, these two systems were ranked equal and highest overall for the Natural Environment Criteria Group. Only a slight difference exists between the next two system rankings. System 4 (Expanded Blue Box) was ranked third overall, slightly ahead of System 3 (Direct Cost). The potential effects on aquatic systems from illegal dumping of wastes was considered to be greater than effects to terrestrial systems and resources due to siting a MRF. The potential effects from illegal dumping, associated with System 3 (Direct Cost) were considered greater since they were expected to occur over the duration of the system's operation.

System 5 (Wet/Dry) and System 6 (Mixed Waste Processing) systems were the second lowest and least ranked for all three criteria. System 6 (Mixed Waste Processing) was ranked lowest overall. Potential effects to the atmospheric environment from System 6 (Mixed Waste Processing) were considered to be greater than the effects of siting more than one 3Rs facility (i.e. new MRF and compost facilities) for System 5 (Wet/Dry). The potential effects to the atmosphere were expected to occur throughout the life of System 6 (Mixed Waste Processing), whereas the effects of siting new facilities were more readily mitigated.

The overall system ranking for the Natural Environment Criteria Group in Durham Region is as follows (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
3 - System 4 (Expanded Blue Box)
4 - System 3 (Direct Cost)
5 - System 5 (Wet/Dry)
6 - System 6 (Mixed Waste Processing)

8.3.1.4 Service Criteria Group (Durham Region)

The following discusses Durham Region system rankings for the Service Criteria Group. System rankings are first discussed by criteria then for the overall criteria group.

Reliability

The reliability of each system was judged according to whether the technologies which form the system had been proven reliable and had operated successfully in at least one jurisdiction in the world at full scale for a period of at least one year. The issue of whether the system was dependent on the success of a single approach was also considered. Single approach systems are more susceptible to collapse in the event of failure of any of the parts.

Since the technology has been proven (specifically for the Durham Region) and the systems were diverse, Systems 1 and 2 (Existing and Existing/Committed) were judged to be equal and highest ranked. Systems 3 and 4 (Direct Cost and Expanded Blue Box) were equal, and second highest ranked. System 3 (Direct Cost) was based on an approach that was proven in North America and it was based, to a degree, on reliance on a single approach. System 4 (Expanded Blue Box) was also based on proven technology, as it has proven successful in Central and South Hastings in Ontario and it relied extensively on public participation for its success.

System 5 (Wet/Dry) was ranked second lowest as it relied on extensive public participation and while technology was proven, it had not been proven on a full scale for a large jurisdiction anywhere in Ontario or North America. Systems 6 (A+B) (low quality and high quality compost) were ranked equally and lowest because they were based on technology that was somewhat unproven to have operated successfully.

Flexibility

System flexibility was judged according to the types and quantities of waste accommodated and compatibility with the Existing system. This criterion incorporated the ability of the system to adapt to changing waste characteristics and quantities. Whether the system would help Durham Region achieve Ontario targets for 50% waste diversion was also taken into account.

Systems 6A and 6B (low quality and high quality compost) were judged to be highest ranked, with the high diversion system being favoured over the low diversion system. Although there was some question about the ultimate fate of secondary materials from

Mixed Waste Processing plants, both systems were judged to be compatible with the existing collection system and to lead to increased waste diversion.

System 5 (Wet/Dry) was judged to be second highest ranked as it collects a wide range and greater quantity of materials that are not regularly collected in Blue Box programs. One major benefit of this system is that it can divert significant quantities of wet waste, and is therefore more flexible than the other systems. It was limited by its requirement for new facilities in Durham Region and the fundamental changes required to the Existing system. System 4 (Expanded Blue Box) was judged as third highest ranked. While it collected a wider range and quantity of materials and was compatible with the Existing/Committed system, the overall projected quantities of materials collected were lower than for some systems and it would require a shift in Durham Region to weekly collection of recyclables.

Systems 1, 2 and 3 (Existing, Existing/Committed and Direct Cost) are each ranked lowest ranked. Although each was compatible with the Existing system, they did not markedly expand the range of materials collected.

Performance

System performance was judged according to the amount of material diverted or disposed. System 6B (Mixed Waste Processing - high quality compost) was ranked highest because it significantly increases the amount of material diverted, despite the fact that the potential lower quality of secondary materials may reduce their marketability. This system could potentially divert 78% to 84% of residential waste in Durham.

Systems 5 (Wet/Dry) and 6A (Mixed Waste Processing - low quality compost) were ranked as second highest with System 5 slightly ahead of System 6A due to a higher quantity of materials diverted and a higher degree of source separation, contributing to potential higher market value for secondary materials. Both systems have the potential to divert 68% of the residential waste stream.

Systems 3 (Direct Cost) and System 4 (Expanded Blue Box) were ranked equal and second lowest, with the ability to divert 43-61% of the residential waste stream.

Systems 1 (Existing) and System 2 (Existing/Committed) were ranked equally lowest due to the low level of material diverted, and the limited potential to divert 27-33% of the residential waste stream.

Social Acceptability

The social acceptability of each system was evaluated on the basis of the potential effects of the systems on participation, attitudes and perception of 3Rs activities and willingness to pay for the system. Based on these indicators, System 4 (Expanded Blue Box) was identified as the highest ranked system because residents and municipalities are familiar with the system components and could be expected to respond more quickly and more positively to the system. System 4 would provide an improved level of service to residents (eg., weekly collection of the Blue Box) which is likely to encourage greater participation; and, costs would be acceptable, assuming current levels of subsidy continue.

Systems 3 and 5 (Direct Cost, Wet/Dry) were ranked the second highest because they both have the potential to encourage greater participation in 3Rs and both were suitable for low density urban areas of Durham. However, there were uncertainties for both systems concerning the participation by apartment households and effects in rural areas. Both systems were higher ranked than Systems 1, 2 and 6 (Existing, Existing/Committed, Mixed Waste Processing) because they have greater potential to encourage stronger positive attitudes and behaviour toward the 3Rs.

Systems 1 and 2 (Existing, Existing/Committed) were the third highest ranked because, although residents are familiar with the components of the systems and costs were acceptable (if current subsidies continue), they were unlikely to increase participation by individuals in 3Rs activities as much as Systems 3, 4, and 5 (Direct Cost, Expanded Blue Box, Wet/Dry).

System 6 (Mixed Waste Processing) was ranked lowest due to potential operational problems with respect to odour; it does not encourage source separation and could reduce individual participation in some of the components of the system (e.g. Blue Box); and, the costs for the Mixed Waste Processing and composting facility are likely to be less acceptable to residents and municipalities. No distinction was made between Systems 6A and 6B.

The system rankings by criteria are summarized in Table 8.8.

TABLE 8.8

DURHAM REGION
NET EFFECTS SUMMARY FOR SERVICE

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/ Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
IMPACT							
Service	**Lowest ranked**	**Lowest ranked**	**Third highest ranked**	**Highest ranked**	**Second highest ranked**	**Lowest ranked**	**Lowest ranked**
Reliability	Highest ranked due to: · technologies presently exist and are proven · success is not due to reliance on single approach	Highest ranked due to: · technologies presently exist and are proven · success is not due to reliance on single approach	Second highest ranked due to: · technologies presently exist and are proven (in North America) · success relies on single economic incentive based approach · success partially dependent on participation in additional source separation by residents	Second highest ranked due to: · technologies presently exist and are proven · success is not due to reliance on a single approach · relies on increased public participation	Second highest ranked due to: · technology proven, but not in North America or Ontario · relies on increased public participation	Highest ranked due to: · unproven technology that is not fully successful anywhere in North America at present · applies single approach to third bag of waste · approach contradicts present policy of source separation	Highest ranked due to: · unproven technology that is not fully successful anywhere in North America at present · applies single approach to third bag of waste · approach contradicts present policy of source separation
Flexibility	Lowest ranked due to: · limited range and quantity of materials accommodated	Lowest ranked due to: · limited range and quantity of materials accommodated with no significant increase in demand expected · committed MRF to provide increased processing capacity	Lowest ranked due to: · limited range of materials accommodated · basic compatibility with existing/ committed system · depends on homeowner for success	Third highest ranked due to: · collects wider range and higher quantities of materials · requires switch to weekly collection of recyclables · compatible with and expands on existing/ committed system · depends on homeowner for success	Second highest ranked due to: · collection of wider range and greater quantities of materials (including wet waste and others not captured in residential blue box programs) · expanded or new MRF and new centralized compost plant required to accommodate increased quantities of materials · requires fundamental change to existing system for residential participation system	Highest ranked due to: · provides ability to divert both wet and dry wastes · increased waste diversion · compatible with existing collection system · may decrease value, selling price of secondary materials and efficiency of recycling due to contamination · compost quality unlikely to meet Ontario guidelines	Highest ranked due to: · provides ability to divert both wet and dry wastes · increased waste diversion · compatible with existing collection system · may decrease value, selling price of secondary materials and efficiency of recycling
Performance	Lowest ranked due to: · diversion of 27-32%	Lowest ranked due to: · diversion of 28-33%	Second lowest ranked due to: · diversion of 43-53%	Second lowest ranked due to: · diversion of 48-61%	Second highest ranked due to: · diversion of 61-69%	Second highest ranked due to: · diversion of 60-68%	Highest ranked due to: · waste diversion of 78-84%

DURHAM REGION
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/ Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability	Third highest ranked due to: · maintain or small positive increase in 3Rs behaviour · no changes to the system; residents are familiar with it · not likely to encourage greater individual action · costs acceptable to residents and municipalities if current subsidies continue	Third highest ranked due to: · small positive increase in 3Rs behaviour · minor changes to the system; residents are familiar with it · not likely to encourage greater individual action · costs acceptable to residents and municipalities if current subsidies continue	Second highest ranked due to: · potential to encourage greater participation by individuals in 3Rs · potential for controversy for some municipalities in the short-term; Potential for controversy reduced if education and consultation program implemented and appropriate user pay options selected for the Region · difficult to implement user pay and composting in high density housing and unlikely to significantly increase participation in high-rises (represent a low proportion of households in Durham) · Uncertain of implementation of user pay in rural, self haul areas · Potential for more illegal dumping and incineration than the other systems	Highest ranked due to: · residents and municipalities are familiar with the system, participation likely to increase with education and promotion · costs are acceptable if current level of subsidies continue. If not, municipal costs may not be acceptable and service may be reduced, reducing the effectiveness of the system	Second highest ranked due to: · suitable for the low density urban areas of Durham; application to and acceptance in high-rise apartments and rural areas uncertain · ethnic homogeneity suggests education program may be effective · acceptability of the system may be affected by odour, health and vermin effects from food waste composting facilities · residents may not separate high proportion of food waste, particularly in winter · potential for a variety of inconveniences which may reduce its popularity · potential for contamination of recyclable and dry streams because people are unwilling, unable or lack knowledge to source separate properly · attaining high levels of participation difficult for elderly, disabled, multi-family households and in the initial phase, some language groups	Lowest ranked due to: · potential for processing and composting facility to be unacceptable · system does not encourage source separation; could reduce participation in blue box and household composting · residents and municipalities may be unwilling/unable to pay for the high capital costs · potential for higher contamination of recyclables than the other systems because people are unable, unwilling or lack knowledge to source separate properly	Lowest ranked due to: · potential for processing and composting facility to be unacceptable · system does not encourage source separation; could reduce participation in blue box and household composting · residents and municipalities may be unwilling/unable to pay for the high capital costs · potential for higher contamination of recyclables than the other systems because people are unable, unwilling or lack knowledge to source separate properly

Service Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and criteria rankings, an overall Durham Region system ranking was completed for the Service Criteria Group. Any system that received a mix of a lowest and highest ranking for Reliability and Performance (the two top ranked criteria) was ruled out of contention as a highest ranked system. Any such systems were then evaluated by Social Acceptability and Flexibility.

Systems 6 (A+B) (Mixed Waste Processing) received the highest ranking for performance, but the lowest for reliability, and were therefore eliminated from consideration as the highest ranked system. The same was true (in reverse) for System 1 (Existing) and System 2 (Existing/Committed).

System 4 (Expanded Blue Box) was highest ranked for social acceptability, second highest ranked for reliability, and third highest ranked for performance. It was ranked the highest because it combined reasonable performance and reliability with a high degree of social acceptance.

System 5 (Wet/Dry) was ranked second highest, having received a rank of second highest for performance, social acceptability and flexibility, and a rank of second lowest for reliability. When System 5 is compared to System 3, it has a similar combination of high and low reliability and performance, therefore for the two most important criteria, performance and reliability, these two systems are considered equal. They are also considered equally socially acceptable. However, System 5 receives a higher ranking, as it is more flexible than System 3. Therefore, System 3 (Direct Cost) was ranked third highest.

The Existing, Existing/Committed, and Mixed Waste systems are all ranked equally as lowest. The mixed waste systems combine high performance and flexibility with low reliability, therefore, there is not strong confidence that they can consistently assure high diversion. In addition, they are the least socially acceptable of the systems considered. On this basis, they are ranked lowest, as they do not meet the service objectives of the project. The Existing and Existing/Committed are considered the lowest from a waste diversion point of view. They are second lowest ranked for social acceptability. These systems are ranked lowest on the basis that they cannot meet the service objectives of the project.

In summary, the system ranking under the Service Criteria Grouping for Durham Region was (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 5 (Wet/Dry)
3 - System 3 (Direct Cost)
4 - System 1 (Existing)
4 - System 2 (Existing/Committed)
4 - Systems 6 (A+B) (Mixed Waste Processing)

8.3.1.5 Social Environment Criteria Group (Durham Region)

The system rankings by criterion were based on the "system net effects by criteria" and "advantages/disadvantages by criteria" contained in the individual system summary net effects tables contained in the Social Environment Technical Appendix.

Net effects common to all systems were not carried forward to the overall ranking of the system options for the Social Environment Criteria Group because they did not assist in distinguishing among systems. Although the systems were named for the dominant element of the system (e.g., Expanded Blue Box) the evaluation was based on the entire system and all of its components as described in Section 7.6. The system rankings for the three Social Environment Criteria Group are discussed below and summarized in Table 8.9. The overall system rankings can be found in the top row of Table 8.9.

For the purpose of the Social Environment Criteria Group evaluation, Systems 6A and 6B were considered to be essentially the same and are referred to as System 6.

Potential Local Community Impacts

Potential local community impacts were anticipated as a result of siting new 3Rs facilities and the expansion and increased use of existing facilities and non-optimal operating conditions. The potential effects of increased volumes of materials flowing through existing facilities were taken to be the same for all systems and did not lead to one system being ranked over another.

TABLE 8.9

REGION OF DURHAM
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
IMPACT						
Social	Lowest ranked	Second lowest ranked	Highest ranked	Highest ranked	Second highest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · Systems 1, 2 and 3 have the same facilities; potential disruption effects are due to increased use of existing facilities · potential effects are likely less important than Systems 4 - 6	Highest ranked due to: · Systems 1, 2 and 3 have the same facilities; potential disruption effects are due to increased use of existing facilities with increased volumes of materials and improvements to the existing MRF · potential effects are likely less important than Systems 4 - 6	Highest ranked due to: · Systems 1, 2 and 3 have the same facilities; potential disruption effects are due to increased use of existing facilities with increased volumes of materials and improvements to the existing MRF · potential effects are likely less important than Systems 4 - 6 · potential for effects from illegal dumping/burning (magnitude uncertain)	Second highest ranked due to: · this system has the same facilities as Systems 1 - 3, but requires expansion of existing or a new MRF and new depots; potential for displacement and disruption effects due to expanded use of existing facilities and expansion of an existing MRF or new MRF and new depots · potential effects are likely less important than Systems 5 and 6, but more than Systems 1 - 3	Second lowest ranked due to: · this system has the same facilities as Systems 1 - 3, but requires a new centralized composting facility for wet waste, expansion of existing or a new MRF and depots; potential displacement and disruption effects due to expanded use of existing facilities, new composting facility, depots and expansion of existing MRFs or a new MRF. · potential effects are likely less important than System 6, but more than Systems 1 - 4	Lowest ranked due to: · greatest potential for displacement and disruption of residents, community features and disruption of community due to new mixed waste processing and composting facility · potential for health concerns associated with processing and composting facility

TABLE 8.9

REGION OF DURHAM
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Potential for Broad Social Impact	Lowest ranked due to: · unlikely to maximize potential for lifestyle change · limited potential for additional employment and economic development in the short or long term. · most convenient system for residents (with System 2)	Second lowest ranked due to: · potential to increase but not maximize the potential for lifestyle change · potential for some additional employment and economic development in the short and long term · most convenient for residents (with System 1)	Second highest ranked due to: · potentially fosters greater awareness of benefit of 3Rs and should encourage change to more sustainable lifestyle · some potential additional employment and economic development in the short and long term with more reliable supply of materials for recycling · potential increase in illegal disposal and incineration by households · potentially less convenient than Systems 1 or 2	Highest ranked due to: · potential for residents to participate more effectively in source separation than other systems due to familiarity · potential to increase but not maximize the potential for lifestyle change · potential for additional employment and economic development in the short and long term with more reliable supply of materials for recycling	Third highest ranked due to: · potential for increased economic development with more reliable supply of materials for recycling industries with less contamination than mixed waste · uncertain if the system will maximize positive lifestyle change (could reduce the participation in source separation)	Second lowest ranked due to: · potential for increased economic development with more reliable supply of materials for recycling industries · however potential for greater contamination of the recyclable and compost streams than the other systems · unlikely to maximize positive lifestyle change

TABLE 8.9

REGION OF DURHAM
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Potential for Broad Social Impact (continued)				· potential for greater inconvenience than Systems 1 - 3 (considered low effect)	· potential for greater inconvenience than Systems 1 - 4. Variety of lifestyle inconveniences associated with larger bins; inconveniences for elderly, disabled and other groups with wet/dry bins · appears to be difficult to implement in high density (low proportion of Durham) and rural areas	· may reduce the amount of household source separation · potential for greater inconvenience than Systems 1 - 3, if residents participate fully

TABLE 8.9

REGION OF DURHAM
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Distribution of Social Costs and Benefits	Lowest ranked due to: · potentially least positive effect on future generations due to least potential to influence future 3Rs behaviour · least positive effect on distribution between household types as some households provided with greater opportunities to participate than others · least negative distribution effects as no new facilities are required (equal for Systems 1 - 3)	Second lowest ranked due to: · potentially second least positive effect on future generations due to least potential to influence future 3Rs behaviour · potentially more equitable distribution of 3Rs services between housing types than System 1, but less than Systems 3 - 6 · least negative distribution effects as no new facilities are required (equal for Systems 1 - 3)	Second highest ranked due to: · potential increased financial burden for large households · potential for positive benefit to future generations uncertain but should have greater benefit than Systems 1 and 2 (depends on amount and effects of illegal dumping/burning). · potentially more equitable distribution of 3Rs services between housing types than Systems 1 and 2, but less than 4 and 5 · least negative distribution effects as no new facilities are required (equal for Systems 1 - 3) · application to multi-family and rural areas uncertain	Highest ranked due to: · more equitable distribution of 3Rs opportunities than Systems 1, 2 and 3 as most households are provided with opportunities to participate · potentially positive distributional effects for current and next generation with continuing growth in changes to 3Rs lifestyle/behaviour; current generation and individuals taking greater responsibility for managing their resources · second least negative distribution effects due to facilities, effects greater than Systems 1 - 3, but less than Systems 5 and 6	Second highest ranked due to: · more equitable distribution of 3Rs opportunities than Systems 1, 2 and 3 · potential for greater benefit to future generations from higher volumes of waste diverted but may have negative effect on future 3Rs behaviour · uncertain of the application to multi-family · second most negative distribution effects due to facilities, greater than Systems 1 - 4, but less than System 6	Second lowest ranked due to: · improved distribution effects by providing 3Rs service to more people than Systems 1, 2 and 3 · greatest potential for negative distribution effects due to facilities · potential for greater benefit to future generation from highest volumes of waste diverted but may have negative effect on future 3Rs behaviour from reduced participation in source separation

Systems 1 (Existing), 2 (Existing/Committed) and 3 (Direct Cost) were ranked equally as the highest ranked because all of the necessary facilities are in place, while the other systems require expansion of existing facilities or new facilities. The improvements to the MRF were not considered an important enough effect to change the ranking. Although there is the potential for social effects from illegal dumping to occur with System 3 (Direct Cost), the significance of the effects was uncertain and was not considered important enough to change the ranking.

Systems 4 (Expanded Blue Box), 5 (Wet/Dry) and 6 (Mixed Waste Processing), all required expansion of existing facilities and/or new facilities. System 4 (Expanded Blue Box) was ranked the second highest. It requires either expansion to the existing MRF or a new MRF and depots. The potential displacement and disruption effects, while more significant than similar effects for Systems 1, 2 and 3 (Existing, Existing/Committed, Direct Cost) are less significant than similar effects for Systems 5 and 6.

System 5 (Wet/Dry) was ranked second lowest because in addition to the facilities in System 4 (Expanded Blue Box) it had an additional composting facility for wet waste with the resulting potential effects.

System 6 (Mixed Waste Processing) was ranked lowest because it had the greatest potential for displacement and disruption effects. This system will have the same facilities as systems 1, 2 and 3 (Existing, Existing/Committed, Direct Cost), but would also include a mixed waste processing and composting facility. It was expected that the effects of this facility would be more important than the effects of the separate MRF and composting facility of System 5 (Wet/Dry).

Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social impacts on the Durham Region's broad social environment in terms of the lifestyles and the employment and economic development opportunities in the Region over the planning period.

System 4 (Expanded Blue Box) was found to be the highest ranked because it provided the potential for residents to continue to change their lifestyle in a way that is familiar to them while encouraging separation of a greater number of materials, more frequently and with less error than the other systems. Systems 3, 5, and 6 (Direct Cost, Wet/Dry, Mixed Waste Processing) had a greater potential for faulty source separation, both deliberate and inadvertent. Systems 1 and 2 (Existing, Existing/Committed) did not provide as much

source separation opportunity to as great a number of people as System 4 does. System 4 (Expanded Blue Box) also has greater potential for additional employment and economic development than Systems 1, 2, and 3 (Existing, Existing/Committed, Direct Cost), due to a more reliable supply of materials for recycling and "green" industries.

System 3 (Direct Cost) was ranked the second highest ranked system because it too should encourage additional change to a lifestyle that incorporates higher levels of personal involvement by residents in the management of their wastes. This system also had greater potential for additional employment and economic development than Systems 1 and 2 (Existing, Existing/Committed) due to a more reliable supply of materials for recycling and "green" industries. However, there was a greater potential for some residents to engage in illegal dumping and incineration to reduce the amount of waste for which they had to pay collection costs. In addition, it was uncertain how the system would be implemented in apartment buildings and in rural areas.

System 5 (Wet/Dry) was ranked third highest because, although it had potential to increase employment and economic development by providing a more reliable supply of materials to recycling and "green" industries with less contamination than System 6 (Mixed Waste Processing), it was uncertain whether the system would achieve a change in lifestyle in the Durham Region that incorporated personal involvement in the management of waste. The opportunity exists for residents not to separate their recyclables and compostables, but instead to put them into the garbage stream. In addition, this system may be difficult and inconvenient to implement in apartment buildings and in rural areas. Furthermore, there were potentially a number of inconveniences for a variety of groups associated with the bin system.

Systems 2 and 6 (Existing/Committed, Mixed Waste Processing) were ranked the second lowest because although they were likely to have some different types and magnitudes of effects, they were determined to have a similar potential net change in the Region. The net change for these systems was considered less positive than Systems 3, 4, and 5 (Direct Cost, Expanded Blue Box, Wet/Dry). System 2 (Existing/Committed) had potential for only a small positive increase in employment and economic development opportunities, and for support of a change in lifestyle to more personal involvement of residents in managing their wastes. System 6 (Mixed Waste Processing) had greater potential for employment and economic development through the supply of greater volumes of material for industries than System 2 (Existing/Committed), but it may reduce the participation of residents in source separation and may not support further development of the 3Rs. If residents participate fully in this system it could be somewhat inconvenient.

System 1 (Existing) was determined to be the lowest ranked because it was unlikely to influence a change in lifestyle to incorporate personal involvement in the management of the household's waste. This system was unlikely to have a positive effect on employment and economic development as there was likely to be no significant increase in the supply of materials to the recycling and "green" industries and there was less requirement for manufacture and construction of the system's components (e.g., backyard composters).

Distribution of Social Costs and Benefits

Potential distributional effects were predicted to occur as a result of lifestyle changes on some groups in the Region and on future generations. System 4 (Expanded Blue Box) was determined to be the highest ranked due to its overall positive current and future generation effects. It provided 3Rs service to more people than Systems 1, 2, and 3 (Existing, Existing/Committed, Direct Cost) and continued the growth in changes to 3Rs lifestyle/behaviour that should have greater benefit to future generations than Systems 1, 2, and 3. It also had fewer negative distribution effects in the planning period due to fewer facilities being required than Systems 5, and 6 (Wet/Dry, Mixed Waste Processing).

Systems 3 (Direct Cost) and 5 (Wet/Dry) were ranked equally as the second highest due to a number of trade-offs. Both had potential for significant benefit to future generations (with some uncertainty about the magnitude of effect), although with Wet/Dry there was a potential concern that residents may not actively source separate and with Direct Cost that illegal dumping and burning may occur. System 5 (Wet/Dry) also had a more equitable distribution of 3Rs service, although there was a concern that it may not be feasible for the elderly, disabled, rural and apartment residents. With System 5 there was also potentially a greater negative distribution effect from facilities than Systems 1 to 4. Direct Cost had the potential to place financial burden on large households and its application to multi-family and rural areas was uncertain. System 3 (Direct Cost) also had a more equitable distribution of 3Rs service than either Systems 1 or 2 (Existing, Existing/ Committed).

Systems 2 (Existing/Committed) and 6 (Mixed Waste Processing) were ranked equally as the second lowest. System 2 (Existing/Committed) had the second lowest positive effect on future generations with minimal additional support over System 1 (Existing) for changes in lifestyle to encourage greater personal involvement by residents in the management of their waste. It had a small improvement through the provision of 3Rs service to a greater proportion of households than System 1 (Existing). System 6 (Mixed Waste Processing) had the potential for significant negative distributional effects on some residents from the mixed waste processing facility and the uncertainty of the benefit to

future generations through the diversion of more material from landfills with the possibility of influencing behaviour away from the 3Rs. However, it improved the distribution of services over Systems 1 and 2 (Existing, Existing/Committed).

System 1 (Existing) was ranked lowest because it was likely to have the least positive distribution effects on future generations by not encouraging a significant change in the lifestyle of the current generation toward greater personal involvement of residents in the management of their wastes. It also did not provide as great an improvement in the distribution of 3Rs service to residents as do the other systems. It had the least negative distribution effects due to facilities.

Social Environment Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and the criteria rankings, noting that all criteria were ranked equally, an overall system ranking was completed for the Social Environment Criteria Group on a qualitative basis. The evaluation considered trade-offs among the rankings for each system and criterion. There may be significant potential effects from the 3Rs systems and the potential effects for each criterion may occur throughout the life of the system and some may continue beyond the planning period.

Systems 3 (Direct Cost) and 4 (Expanded Blue Box) were the highest ranked systems overall. System 4 (Expanded Blue Box) was highest ranked for the criteria potential for broad social impact and distribution of social costs and benefits and second highest for potential local community impacts. System 3 (Direct Cost) was ranked highest for potential local community impacts and second highest for the other two criteria. Due to some of the uncertainties involved in the analysis, a judgement could not be made on which of the two systems was better than the other.

System 5 (Wet/Dry) was ranked second highest on the basis that it was the second highest ranked for the distribution of social costs and benefits and third highest ranked system for broad social impact criteria. It ranked as the second lowest for potential local community impact. These rankings, overall, provided input to a ranking of System 5 (Wet/Dry) higher than Systems 1, 2, and 6 (Existing, Existing/Committed, Mixed Waste Processing). Although systems 1 and 2 were ranked higher for the potential local community impact, the rankings for potential for broad social impact and distribution of social costs and benefits were significantly higher for System 5 compared to Systems 1 and 2 (Existing, Existing/Committed).

System 2 (Existing/Committed) was ranked the second lowest. It was ranked the highest for the potential local community impacts criterion and second lowest for the other two social criteria.

Based on the uncertainties involved in the analysis, a judgement could not be made as to whether System 1 (Existing) or System 6 (Mixed Waste Processing) should be ranked higher. System 1 was the highest ranked for potential local community impacts and lowest ranked for both potential for broad social impact and distribution of social costs and benefits. System 6 was also ranked the lowest since it was ranked lowest for potential local community impact, and second lowest for both broad social impact and distribution of social costs and benefits.

A summary of the overall system ranking for Durham Region for the Social Environment Criteria Group is presented below (highest ranked to lowest ranked):

1 - System 3 (Direct Cost)
1 - System 4 (Expanded Blue Box)
3 - System 5 (Wet/Dry)
4 - System 2 (Existing/Committed)
5 - System 1 (Existing)
5 - Systems 6 (A+B) (Mixed Waste Processing)

8.3.2 Metro Toronto Systems Evaluation

8.3.2.1 Cost Criteria Group (Metro Toronto)

The Cost Criteria Group contains only one criterion, which was the cost per household for the waste management system (diversion and disposal) based on 1992 dollars. This is estimated for all systems using 1992 unit rates and waste quantities for comparison of systems.

This indicator is based on the costs of the waste diversion systems and the waste disposal system (in $/year) and dividing the sum of these costs by the total number of households in each Region. It provides a measure of how different diversion systems compare, when all waste management factors are taken into account.

A number of diversion system cost indicators (e.g. cost/hh/year for the diversion system, costs/tonne diverted, etc.) were considered but were found to be of little value unless system costs were considered.

Cost Criteria Group - Overall System Ranking

Table 8.10 summarizes system cost per household data for Metro Toronto.

Systems 1 to 4 (Existing, Existing/Committed, Direct Cost, Expanded Blue Box) rank highest, with system costs (measured as cost/household/year) in the $131 to $153/household/year range, if disposal costs of $40/tonne were assumed, and $174 to $180/hh/year if disposal costs of $80/tonne were assumed. Within the accuracy level of this study, these costs were considered equal.

System 5 (Wet/Dry) had a larger range of potential costs, due to the uncertainty of three-stream collection costs. At the lower collection cost it compared to Systems 1 to 4, at the higher collection cost, it compared with System 6B (Mixed Waste Processing). For cost ranking, System 5 (Wet/Dry) was presented as two sub-systems, System 5A which has a high collection cost, and was lowest ranked, and System 5B, which had a low collection cost, and was highest ranked.

System 6 (Mixed Waste Processing) was the lowest ranked, with an overall system costs of $237 to $244/household/year, if the mixed waste system produced a high quality compost, and $247 to 266/household/year if the compost quality was poor (i.e. greater quantities of material from the mixed waste plant would be landfilled due to limited end use opportunities).

8.3.2.2 Municipal Finance Criteria Group (Metro Toronto)

The following describes Metro Toronto system rankings for the Municipal Finance Criteria Group. The individual system rankings are presented first by each criteria and are followed by the overall criteria group rankings.

TABLE 8.10

METROPOLITAN TORONTO
NET EFFECTS SUMMARY FOR COST

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5A Wet/Dry (high collection cost)	System 5B Wet/Dry (low collection cost)	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
IMPACT								
Cost (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Lowest ranked	Highest ranked	Lowest ranked	Lowest ranked
Cost per household (system)	Highest ranked due to: · $131-174/hh/yr	Highest ranked due to: · $132-174/hh/yr	Highest ranked due to: · $146-177/hh/yr	Highest ranked due to: · $153-180/hh/yr	Second highest ranked due to: · $194-214/hh/yr	Highest ranked due to: · $143-163/hh/yr	Lowest ranked due to: · $247-266/hh/yr	Lowest ranked due to: · $237-244/hh/yr

Potential for Impact on Local Taxpayers

The following describes the system net effects on the local tax payer taking into account both total additional tax levy and the household tax effect. As outlined in Table 8.11, System 1 (Existing) is ranked highest as it has the lowest tax levy ($23,747,137) and tax per household ($13). System 2 (Existing/Committed) and System 5 (Wet/Dry) were second highest ranked with both resulting in a 2% increase in taxation. System 3A (Direct Cost) and System 4 (Expanded Blue Box) were third highest ranked both resulting in $31 tax per household and a 3% taxation increase. The third and second lowest ranked systems were System 3B (Direct Cost - revenue neutral) and System 6B (Mixed Waste Processing - high quality compost) systems respectively. System 6A (Mixed Waste Processing - low quality compost) was the lowest ranked system as it would result in a tax per household of $72 equating to a 7% increase.

Potential for Impact on the Debt Burden of the Municipality

The impact of the diversion commitment on the municipal capital program was found to be more significant than the tax impact. This analysis assumed that the full capital cost of future diversion commitments would be annualized at 9% over a 10 year period.

On an overall basis, when all of the debt factors were combined, System 1 (Existing) represented the highest ranked system as it carried no additional capital costs. On the other hand, Systems 6 (A+B) (Mixed Waste Processing) and System 5 (Wet/Dry) were the second lowest and third lowest ranked respectively since they incurred the highest capital costs. All other systems were second highest ranked as they incurred high capital costs, although they affected Metro Toronto's financing to a lesser extent.

Potential Impact on Municipal Reserve Funds

The capital costs of System 6 (A+B) (Mixed Waste Processing) were so large that reserve fund financing was used to offset some of the expenditure. This totalled $25.0 million for System 6A and $50.0 million for System 6B. While debt levels for the other systems were large and potentially subject to reserve contributions, the effect on taxes remained moderate without funding allocations. It was also shown under the system descriptions that System 3B (Direct Cost) had the capacity of generating $45.0 million in extra revenue that could have been placed into reserves and used for other waste management/waste diversion activities.

TABLE 8.11

METRO TORONTO
NET EFFECTS SUMMARY FOR MUNICIPAL FINANCE

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3A Direct Cost (revenue neutral)[1]	System 3B Direct Cost (added revenue)[2]	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste (low quality compost)	System 6B Mixed Waste (high quality compost)
IMPACT								
Municipal Finance (Overall ranking)	Highest ranked	Second highest ranked	Third highest ranked	Third highest ranked	Third highest ranked	Third lowest ranked	Lowest ranked	Second lowest ranked
Impact on Local Taxpayers	Highest ranked due to	Second highest ranked due to:	Third highest ranked due to:	Third lowest ranked due to:	Third highest ranked due to:	Second highest ranked due to:	Lowest ranked due to:	Second lowest ranked due to:
Tax levy ($)	· 23,747,137	· 42,362,618	· 57,773,605	· 102,773,605	· 59,317,648	· 43,311,565	· 138,071,300	· 116,109,288
Tax per household ($)	· 13	· 23	· 31	· 54	· 31	· 23	· 72	· 60
Increase in taxation (%)	1%	· 2%	· 3%	· 5%	· 3%	· 2%	· 7%	· 6%
Impact on Municipal Debt Burden	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Third lowest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:
Amount of debt ($)	0	· 135,681,000	· 135,681,000	· 135,681,000	· 135,681,000	· 166,781,000	· 240,984,000	· 265,984,000
Debt payments ($)	· 0	· 21,142,000	· 21,142,000	· 21,142,000	· 21,142,000	· 25,988,000	· 37,550,000	· 41,446,000
Debt capacity (%)	· 80%	· 76%	· 76%	· 76%	· 76%	· 75%	· 73%	· 73%
Impact on Municipal Reserves	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:
· Total reserves ($)	· 0	· 0	· 0	· 45,000,000	· 0	· 0	· -25,000,000	· -50,000,000
Reserves/household ($)	· 0	· 0	· 0	· 52	· 0	· 0	· 0	· 0
· Reserves/expenses (%)	· 0%	· 0%	· 0%	· 1%	· 0%	· 0%	· 0%	· 0%
Impact on Municipal Level of Service								
Operating cost ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
Expense/household ($)	no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
Impact on Private Sector Industries	Highest ranked due to	Highest ranked due to	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Second lowest ranked due to:
Private funding ($)	no effect	no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
Costs ($)	no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
Higher prices ($)	· no effect	no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Private taxes (%)	1%	· 2%	· 3%	· 3%	· 3%	· 2%	· 7%	· 6%

1 Under the Direct Cost (revenue neutral) system, no additional revenue would be charged for waste and diversion collection purposes from the homeowners beyond what is now collected via municipal taxes.

2 Under the Direct Cost (added revenue) system, garbage bag chargees would be levied in addition to normal property taxes that include waste diversion and disposal collection costs.

As a System 3B (Direct Cost - added revenue) was highest ranked because it adds to the Region's reserve fund position. Conversely, System 6B (Mixed Waste Processing - high quality compost) was lowest ranked since it absorbed the highest amount of reserve funds and System 6A (Mixed Waste Processing - low quality compost) was second lowest ranked. The remaining systems: System 1 (Existing) and System 2 (Existing/Committed), System 3A (Direct Cost - revenue neutral), System 5 (Wet/Dry) and System 4 (Expanded Blue Box) were the second highest ranked because they did not impact the reserve fund.

Potential for Impact on the Level of Municipal Services

As previously indicated, the annualized cost effect of the diversion systems had a low to medium impact on household taxation. The analysis did not consider reductions in service in the other municipal departments to help fund diversion costs. As such, there would be no impact on the functional service levels in the municipalities.

Potential for Impact on Private Sector Industries

The effects analysis did not take into account direct impacts on the private sector to offset costs related to the diversion commitment because residential waste diversion will be paid for by taxes and other public sector funds. However, there is an indirect taxation effect whereby a portion of the diversion cost would be levied in local taxes.

While taxes currently collected from the business sector now approach $897 million, tax charges for each system ranged from 1% for System 1 (Existing) and 2% for System 2 (Existing/Committed) and System 5 (Wet/Dry), 3% for both Systems 3 (A+B) (Direct Cost) (added revenue bag charges are only residentially related) and System 4 (Expanded Blue Box) to 6% for System 6B (Mixed Waste Processing - high quality compost) and 7% for System 6A (Mixed Waste Processing - low quality compost).

As a result of the system ranking based on this criterion, all systems other than System 6 (A+B) (Mixed Waste Processing) were identified to be highest ranked. System 6 (A+B) (Mixed Waste Processing) were considered to be lowest and second lowest ranked respectively.

Municipal Finance Criteria Group - Overall System Ranking

The system rankings by criteria and indicators were based on the system net effects that are summarized above and contained in the Municipal Finance Technical Appendix. The net effects are summarized on Table 8.11. The criteria themselves were not ranked in terms of order of importance, therefore all criteria maintained an equal weighting and no one criteria was viewed to carry more weight, or be of more significance than others. By considering the relative magnitude of the effects for each of the criteria and indicators, an overall systems ranking was completed for Municipal Finance. This is also summarized on Table 8.11.

The highest ranked system was System 1 (Existing). The Existing system would have the least cost impact on the tax payers in Metro Toronto and did not present significant debt costs to the financial structure. System 3 (A+B) (Direct Cost) and System 4 (Expanded Blue Box) were the third highest ranked systems. While the Direct Cost systems represented very different revenue strategies, the ranking indicated the systems' relative merits. The Direct Cost (revenue neutral) system imposed a low cost per household and did not require significant capital costs, while the Direct Cost (added revenue) imposed a medium cost per household and also added to the reserve fund position. The Expanded Blue Box shared the merits of the Direct Cost (revenue neutral) system which imposed a low cost per household and also did not require significant capital costs.

System 6A (Mixed Waste Processing - low quality compost) was the lowest ranked because it carried with it the highest tax effects and also a very high capital cost, and therefore debt. Similarly, as it is less burdensome, the Mixed Waste Processing (low quality compost) system represented the second lowest ranked system. The third lowest ranked system was the Wet/Dry system primarily as a result of its impact on debt capacity and municipal reserves.

To confirm the overall ranking, the municipal finance component also undertook a sensitivity analysis on key variables that may affect the criteria indicators. This analysis is presented in the Municipal Finance Technical Appendix. The sensitivity analysis examined variations in capital costs (plus or minus 10% and 20%), rates of waste diversion (plus or minus 5%), variations in operating cost (plus or minus 5% and 10%) differences in waste disposal costs per tonne including the rate Metro Toronto currently charges for solid waste disposal and, finally, household growth which included a no growth scenario. While utilizing the various ranges of indicators presented above, the sensitivity analysis showed that, the general ranking of the systems presented above would not materially change.

The following summarizes the system rankings for Metro Toronto with respect to Municipal Finance (highest ranked to lowest ranked).

1 - System 1 (Existing)
2 - System 2 (Existing/Committed)
3 - System 3A (Direct Cost [revenue neutral])
3 - System 3B (Direct Cost [added revenue])
3 - System 4 (Expanded Blue Box)
6 - System 5 (Wet/Dry)
7 - System 6B (Mixed Waste [high quality compost])
8 - System 6A (Mixed Waste [low quality compost])

8.3.2.3 Natural Environment Criteria Group (Metro Toronto)

The system rankings by criterion were based on the "system net effects by criterion" and "advantages/disadvantages by criterion" documented in the individual system summary net effects tables for Metro Toronto. These tables are contained in the Natural Environment Technical Appendix. The system rankings for each of the three natural environment criteria are discussed below. The system rankings, by criterion, are summarized in Table 8.12.

When evaluating Systems 6 (A+B) (Mixed Waste Processing), these systems were considered to be the same with respect to the natural environment. These systems were combined and referred to as System 6 for the evaluation.

Potential for Effects to Terrestrial Systems and Resources

Effects to terrestrial systems and resources were predicted to occur as a result of siting new 3Rs facilities and due to discharges of wastes or potentially harmful materials as a result of some accident or upset conditions. The potential for effects due to accidents was expected to be the same for all six systems. System 1 (Existing) system, had all of the required facilities in place. Potential effects were expected only as a result of accidents. Systems 2, 4, 5 and 6, respectively (Existing/Committed, Expanded Blue Box, Wet/Dry and Mixed Waste Processing) were considered equal and each ranked second highest. Systems 2, 4 and 5 all included the same new 3Rs facilities, resulting in similar effects to terrestrial systems and resources for the systems. The new facilities included a central

TABLE 8.12

METRO TORONTO
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
IMPACT						
Natural Environment (Overall ranking)	Highest ranked	Second highest ranked with System 4	Second lowest ranked	Second highest ranked with System 2	Third lowest ranked	Lowest ranked
Potential for effects to terrestrial systems and resources	Highest ranked due to: · necessary facilities already existing · potential effects are due to accidents	Second highest ranked due to: · potential effects due to siting new central compost facility and one to two new MRFs · potential effects are due to accidents	Lowest ranked due to: · potential effects due to siting new central compost facility and one to two new MRFs · potential effects are due to accidents · higher likelihood of illegal dumping of wastes is anticipated and may result in effects	Second highest ranked due to: · potential effects due to siting new central compost facility and one to two new MRFs · potential effects due to accidents	Second highest ranked due to: · potential effects due to siting of one to two new MRFs and new compost facility · potential effects due to accidents	Second highest ranked due to: · potential effects due to siting new mixed waste processing and composting facility · potential effects due to accidents
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities	Second highest ranked due to: · potential effects due to siting new central compost facility and one to two new MRFs · potential effects due to discharges from existing facilities and new compost facility · new central compost facility is in-vessel facility	Lowest ranked due to: · potential effects due to siting new central compost facility and one to two new MRFs · potential effects due to discharges from existing facilities and new compost facility · new central compost facility is in-vessel facility · higher likelihood of illegal dumping of wastes is anticipated and may result in effects	Second highest ranked due to: · potential effects due to siting new central compost facility and one two new MRFs · potential effects due to discharges from existing and new composting facilities · new central compost facility is in-vessel facility	Second highest ranked due to: · potential effects due to siting one to two new MRFs and siting new compost facility · potential effects due to discharges from existing compost facilities and discharges from new compost facility	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting mixed waste processing/composting facility and discharges from new mixed waste facility

TABLE 8.12

METRO TORONTO
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Potential for effects to the atmospheric environment	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · composting of wet wastes at in-vessel facility · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · composting of wet wastes at in-vessel facility · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · composting of wet wastes at in-vessel facility · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases	Second lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · composting of wet wastes at in-vessel facility · additional emissions from increased wet waste composting	Lowest ranked due to: · emissions to atmosphere include dust, exhaust, odours, bioaerosols and gases · additional emissions from mixed waste processing and composting

compost facility and one to two new MRFs. System 6 did not include the compost facility and MRFs, but included a new Mixed Waste Processing and composting facility. Potential effects were due to siting this facility and were expected to be similar to the effects of Systems 2, 4 and 5.

System 3, (Direct Cost) also included the same new 3Rs facilities as were required for Systems 2, 4 and 5 (Existing/Committed, Expanded Blue Box, Wet/Dry). However, this system was ranked lower due to the higher likelihood of illegal dumping of wastes and its resulting effects. The Direct Cost system was the lowest ranked system in terms of potential for effects to terrestrial systems and resources.

Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

Potential effects to aquatic systems and water resources were expected due to facility location, discharges from a facility and accidents. Leachate or contaminated surface water runoff from central compost facilities was expected to result in the most significant effects. All systems were considered equal with respect to effects as a result of discharges from existing facilities. System 1 (Existing) was ranked highest since it had all facilities in place. Systems 2, 4 and 5 (Existing/Committed, Expanded Blue Box, Wet/Dry) were ranked equally and second highest. These three systems required the same new 3Rs facilities. This includes a new central compost facility and one to two new MRFs. Since the compost facility was an in-vessel facility, potential effects due to discharges were expected to be minimal.

System 3 (Direct Cost) and System 6 (Mixed Waste Processing) were both lowest ranked. The Direct Cost system had the same new facility requirements as Systems 2, 4 and 5. However, due to the higher likelihood of illegal dumping of wastes in the Direct Cost system, the system was ranked lower. System 6 required only a new Mixed Waste Processing facility. The potential for effects due to discharges from this facility was considered to be greater than those facilities required by the other system. This was since the central compost facility required by the other systems was an in-vessel facility.

Potential Effects to the Atmospheric Environment

The six system alternatives were expected to have emissions to the atmosphere. These emissions include dust, odours, bio-aerosols and gases generated at MRFs and compost facilities, with dust and exhaust emissions generated by waste collection vehicles.

Emissions to the atmosphere could be reduced by such measures as following proper operating procedures at the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. The potential for effects to the atmosphere from emissions was expected to be greater if wet waste (household organic) or mixed waste was being processed and/or composted at centralized facilities in large volumes. System 1 did not include the management of wet or mixed wastes. Systems 2, 3 and 4 (Existing/Committed, Direct Cost, Expanded Blue Box) included the composting of a small amount of wet wastes annually at an in-vessel compost facility. Due to the small quantities and type of facility, no quantifiable difference in emissions was expected for these systems, relative to System 1. These four systems were ranked highest equally.

The System 5 (Wet/Dry) was considered the second lowest ranked system. This system relied on an increased level of wet waste composting. As a result additional emissions were expected. System 6 (Mixed Waste Processing) was considered lowest ranked. This system included the processing and composting of mixed wastes. This system was lowest ranked due to the nature of the wastes being managed and since the processing and composting of wastes was less controlled than at an in-vessel compost facility.

Natural Environment Criteria Group - Overall System Ranking

Combining the comparative ranking of systems by criterion and the criteria rankings allows an overall system ranking to be completed for the Natural Environment Criteria Group. For each of the three criteria, System 1 was the highest ranked system overall. Systems 2 and 4 (Existing/Committed, Expanded Blue Box) had the same ranking for each of the three criteria. These two systems were both second highest ranked. Systems 2 and 4 were ranked lower than System 1 due to potential effects to terrestrial systems and aquatic systems as a result of siting new 3Rs facilities and discharges from the new compost facility. System 5 (Wet/Dry) was considered only slightly lower ranked than Systems 2 and 4, and third lowest ranked overall. This lower ranking was due to the potential for effects to the atmospheric environment from an increase in the amount of wet waste composted.

System 3 (Direct Cost) was ranked second lowest of the overall systems. The Direct Cost system required the same new 3Rs facilities as the Existing/Committed and Expanded Blue Box systems. The higher likelihood of illegal dumping of wastes occurring in the Direct Cost system, and its effects to terrestrial and aquatic systems, was the reason for the lower ranking. When compared to the Wet/Dry system, Direct Cost was also ranked lower. Both System 3 and 5 (Direct Cost, Wet/Dry) required the same new facilities. However, the potential effects to terrestrial and aquatic systems as a result of illegal

dumping of wastes within System 3 were expected to be more significant than the increase in emissions to the atmosphere from increased wet waste composting in System 5 (Wet/Dry). Wet wastes were composted in an in-vessel facility.

System 6 (Mixed Waste Processing) was ranked lowest overall for the six systems. This system was expected to have the greatest potential for effects to the atmosphere from mixed waste processing and composting. Similarly, potential effects to aquatic systems were expected to be the greatest of all systems due to siting of the mixed waste facility and discharges from the facility.

The following summarizes the Metro Toronto system ranking from the natural environment perspective (highest ranked to lowest ranked):

1 - System 1 (Existing)
2 - System 2 (Existing/Committed)
2 - System 4 (Expanded Blue Box)
4 - System 5 (Wet/Dry)
5 - System 3 (Direct Cost)
6 - Systems 6 (A+B) (Mixed Waste Processing)

8.3.2.4 Service Criteria Group (Metro Toronto)

The "Service" Criteria Group contains four criteria. These are:

- Reliability;
- Flexibility;
- Performance; and
- Social Acceptability.

The system rankings by criteria for the Service Criteria Group for Metro Toronto are presented in Table 8.13 along with a summary of the ranking.

Reliability

The reliability of each system was judged according to whether the technologies which form the system had been proven reliable and had operated successfully in at least one jurisdiction in the world at full scale for a period of at least one year. The issue of whether the system was dependent on the success of a single approach was also

considered. Single approach systems are more susceptible to collapse in the event of failure of any of the parts.

Since the technology is proven (specifically for Metro Toronto) and the systems were diverse, Systems 1 and 2 (Existing and Existing/Committed) were judged to be equal and highest ranked. Systems 3 and 4 (Direct Cost and Expanded Blue Box respectively) were equal, and second highest ranked. System 3 (Direct Cost) was based on an approach that is proven in North America and it was based, to a degree, on reliance on a single approach. System 4 (Expanded Blue Box) was also based on proven technology, as it has proven successful in Centre and South Hastings in Ontario and relied extensively on public participation for its success. Also, Metro Toronto residents are presently participating in a partially expanded program (telephone books, magazines, OCC, some plastics) which has been successful.

System 5 (Wet/Dry) was ranked second lowest as it relied on extensive public participation and while technology had been proven, it had not been proven on a full scale in a large jurisdiction anywhere in Ontario or North America, and it may be limited in its ability to include multi-family buildings. Because these make up almost half of Metro Toronto's housing stock, this was considered a limitation of the system. Extensive research had been carried out on wet-dry systems in the Region of Peel, Halton, and also in Metro Toronto, through a series of pilot projects carried out on an on-going basis for the last two years.

Systems 6 (A+B) (Mixed Waste Processing with high and low quality compost) were ranked equally and lowest because they were based on a technology that is not proven to have operated successfully anywhere in North America using the following four criteria:

- successful operation at full scale for one year;
- no plant shutdowns due to operational problems;
- successful, sustainable markets for secondary materials recovered; and
- successful end uses/markets for finished compost.

Systems 6 (A+B) (Mixed Waste Processing with high and low quality compost) rely on a single approach for the "third bag" of waste. This approach has been abandoned in Europe, having been used there for the processing of municipal waste for the last 40 years.

TABLE 8.13

METRO TORONTO
NET EFFECTS SUMMARY FOR SERVICE

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
IMPACT							
Service (Overall Ranking)	Second lowest ranked	Third lowest ranked	Second highest ranked	Highest ranked	Third highest ranked	Lowest ranked	Lowest ranked
Reliability	Highest ranked due to: · technologies presently exist and are proven · success is not due to reliance on single approach	Highest ranked due to: · technologies presently exist and are proven · success is not due to reliance on a single approach	Second highest ranked due to: · technologies presently exist and are proven · success is not due to reliance on a single approach · success partially dependent on participation in additional source separation by residents	Second highest ranked due to: · technologies presently exist and are proven · success is not due to reliance on a single approach	Second lowest ranked due to: · technology proven in Europe but not yet in North America at full scale · limited ability to include multi-family · depends on one primary approach · relies on significantly increased public participation	Lowest ranked due to: · unproven technology that is not fully successful anywhere in North America at present · applies single approach to third bag of waste · recovered materials of poorer quality - creates marketing problems · very large mixed waste plant (900,000 tonnes/yr) required · compost of poor quality and is landfilled	Lowest ranked due to: · unproven technology that is not fully successful anywhere in North America at present · applies single approach to third bag of waste · recovered materials of poorer quality - creates marketing problems · very large mixed waste plant (900,000 tonnes/yr) required

TABLE 8.13

METRO TORONTO
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Flexibility	Lowest ranked due to: · flexibility limited at present by range of dry materials accepted, and inability to divert significant quantities of organics	Second lowest ranked due to: · new MRF will provide increased processing capacity · new recycling depot provides more opportunity to divert/reuse range of materials · increase in materials collected expected due to addition of some multi-family recycling · partially expanded range of materials will be maintained · proposed composting facility provides processing capacity for organics · new materials (fine paper, pizza boxes, polycoat) added to Blue Box	Third lowest ranked due to: · basic compatibility with existing system · additional quantities of materials generated will be processed in new MRFs · increased range of dry materials can be accommodated · collection of wet wastes not provided	Third highest ranked due to: · basic compatibility with existing system · can phase project in gradually · uses basis of System 1 (Existing/Committed) · larger range of dry materials collected	Second highest ranked due to: · collection of wider range and greater quantity of materials including wet waste and other dry materials not captured in residential blue box programs · proposed MRFs and composting facility in System 1 (Existing/Committed) provide capacity to process materials · compatible with System 1 (Existing/Committed) system	Highest ranked due to: · ability to handle full range of wastes generated · provides ability to divert both wet and dry wastes · not compatible with System 1 (Existing/ Committed) · compatible with existing collection system	Highest ranked due to: · ability to handle full range of wastes generated · provides ability to divert both wet and dry wastes · not compatible with System 1 (Existing/ Committed) · compatible with existing collection system

TABLE 8.13

METRO TORONTO
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Performance	Lowest ranked due to: · limited waste diversion of 19% or up to 24% with source reduction over time	Lowest ranked due to: · limited waste diversion of only 21% or up to 26% with source reduction over time	Second lowest ranked due to: · estimated waste diversion of 33% or up to 47% with source reduction over time	Third highest ranked due to: · estimated waste diversion of 37% or up to 53% with source reduction over time	Second highest ranked due to: · estimated waste diversion of 49% or up to 67% with source reduction over time	Second highest ranked due to: · estimated waste diversion of 54% or up to 60% with source reduction over time	Highest ranked due to: · potential for 74% to 79% waste diversion
Social Acceptability	Second lowest ranked due to: · maintain or small positive increase in 3Rs behaviour · no changes to the system; residents are familiar with it · not likely to encourage greater individual action · costs acceptable to residents and municipalities if current subsidies continue	Third highest ranked due to: · positive increase in 3Rs behaviour · minor changes to the system; residents are familiar with it · likely to encourage greater individual action · costs acceptable to residents and municipalities if current subsidies continue · suitable to high density housing	Second highest ranked due to: · potential to encourage greater participation by individuals in 3Rs · potential for controversy for some municipalities · potential for controversy reduced if education and consultation program implemented and appropriate user pay options selected	Highest ranked due to: · level of participation in composting and recycling in multi-family households is uncertain · residents and municipalities are familiar with and accepting of the system and the infrastructure is in place	Third lowest ranked due to: · acceptance of most components of the system · suitable for low density areas of Metro Toronto · acceptability of the system may be affected by odour, health and vermin effects from food waste composting facilities	Lowest ranked due to: · potential for processing and composting facility operation to be unacceptable · system does not encourage source separation; could reduce participation in blue box and household composting · residents and municipalities may be unlikely/unable to pay for the high capital costs	Lowest ranked due to: · potential for processing and composting facility operation to be unacceptable · system does not encourage source separation; could reduce participation in blue box and household composting · residents and municipalities may be unlikely/unable to pay for the high capital costs

TABLE 8.13

METRO TORONTO
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability (continued)			· difficult to implement user pay and composting in high density housing and unlikely to significantly increase participation in high-rises	· costs are acceptable if current level of subsidies continue. If subsidies do not continue municipal costs may not be acceptable and service may be reduced, reducing the effectiveness of the system	· residents may not separate high proportion of food waste, particularly in winter · potential for contamination of recycle and compost streams because people are unwilling, unable or lack knowledge to source separate properly · potential for a variety of inconveniences which may reduce its popularity · uncertain of application of wet/dry system in multi-family · attaining high levels of participation difficult for elderly, disabled, multi-family households, and in the initial phase some language groups	· potential for higher contamination of recyclables than the other systems because people are unable, unwilling or lack knowledge to source separate properly	· potential for higher contamination of recyclables than the other systems because people are unable, unwilling or lack knowledge to source separate properly

Flexibility

System flexibility was judged according to the types and quantities of waste accommodated and compatibility with the Existing system. This criterion incorporated the ability of the system to adapt to changing waste characteristics and quantities.

Systems 6 (A+B) (Mixed Waste Processing with high and low quality compost) were judged to be highest ranked because they can handle the full range and quantity of residential materials generated in Metro Toronto. Although there was some question about the ultimate fate of secondary materials from Mixed Waste Processing plants, both systems were judged to be compatible with the existing collection system and to lead to significantly increased waste diversion.

System 5 (Wet/Dry) was also judged to be second highest ranked as it collected a wider range and greater quantity of dry materials that were not regularly collected in Blue Box programs. The proposed MRF and composting facility in the Existing/Committed system provided the capacity to process both the organics and the expanded list of dry materials recovered by this system. (Neither of these facilities are likely to be constructed within the next five years). In addition, System 5 provided the capacity to divert significant quantities of wet household (food) waste, which can not be diverted by Systems 1 to 4. This system therefore had greater flexibility than Systems 1 to 4, as it can divert a significant quantity of wet wastes.

System 4 (Expanded Blue Box) was judged as third highest ranked. While it collected a wider range and quantity of dry materials and was compatible with the Existing/Committed system, the overall projected quantities of materials collected were lower than in some systems. In addition it did not have the flexibility to divert significant quantities of wet materials. City of Toronto currently collects some of the list of Expanded Blue Box materials, hence System 4 would not require a change in behaviour for some residents.

System 3 (Direct Cost) was ranked third lowest. It was compatible with the System 2 (Existing/Committed). Processing capacity would be likely available under System 2 (Existing/Committed) for the additional quantities of materials that the system would generate. It was ranked higher than System 2 because it diverted the same range of materials, but in higher quantities. System 2 (Existing/Committed) was ranked second lowest. While compatible with the Cost Criteria Group, it would handle only a slightly increased range of materials. System 1 (Existing) was lowest ranked because it diverted a limited range and quantity of materials.

Performance

System performance was judged according to the amount of material diverted by each system, expressed as a percentage of the waste generated. For diversion estimates it was assumed that markets would exist for all recovered materials.

System 6B (Mixed Waste Processing - high quality compost) was ranked highest because it significantly increased the amount of material diverted, despite the fact that the potential lower quality of secondary materials may reduce their marketability. For this system, it was assumed that markets/end uses could be found for all of the finished compost, resulting in an overall diversion rate of up to 79%.

System 6A (Mixed Waste Processing - low quality compost) was ranked second highest, along with System 5 (Wet-Dry). Both systems have the potential to divert 54-60% of the residential waste stream. For System 6A (Mixed Waste Processing - low quality compost), it was assumed that market end uses could not be found and that the compost would have to be landfilled.

System 3 (Direct Cost) and System 4 (Expanded Blue Box) were ranked as third lowest and third highest respectively, with diversion potential in the 33 to 53% range. The range reflects some uncertainty in the level of source reduction achievable by the year 2000. This had been estimated at 5% based on 1992 base case rates, for the purpose of this study. The level of participation in backyard composting was also somewhat uncertain. The higher diversion estimate assumed that 80% of single family households would divert up to 240 kg/hh/year, the lower rate assumes that some households would average a reduced rate of 100 kg/hh/year. In addition, some systems have a limited ability to divert residential waste, because of the high proportion of the Metro housing stock which is in multi-family units. Diversion estimates were based on the assumption that diversion by multi-family residents could average anywhere from 30% to 100% of the diversion rates achieved by single-family residents through curbside service.

System 1 (Existing) and System 2 (Existing/Committed) were lowest ranked due to the lower level of material diverted. These systems were estimated to divert 19% to 26% of the residential waste stream, which is below the provincial diversion target of 50%.

Social Acceptability

The social acceptability of each system was evaluated on the basis of the potential effects of the systems on participation, attitudes and perceptions of 3Rs activities and willingness to pay for the system. Based on these indicators, System 4 (Expanded Blue Box) was identified as the highest ranked system because residents and municipalities were familiar with the system components and the infrastructure, and could be expected to respond more quickly and more positively to the system. System 4 (Expanded Blue Box) appeared to be more suitable to the broad range of housing density patterns in Metro Toronto than either Systems 3 or 5 (Direct Cost, Wet/Dry) equal to System 6 (Mixed Waste Processing), and more comprehensive than either Systems 1 or 2. Residents and municipalities appear willing to pay for the system if current subsidies continue. Therefore System 4 should lead to increased participation, improved attitudes and perceptions and a willingness to pay.

System 3 (Direct Cost) was ranked the second highest because it had greater potential for positive attitudes, perceptions and participation than Systems 1, 2 and possible 5 and 6. There were likely to be some initial negative attitudes associated with Direct Cost; however, with the proper selection of system and meaningful public consultation, these negative concerns should be reduced in the long-term. The implementation of Direct Cost in high-rise apartments may be ineffective in increasing participation beyond that of System 2 (Existing/Committed). Because System 3 (Direct Cost) may increase participation in low density areas of Metro Toronto over System 2 (Existing/Committed), it ranked higher, although the difference between the two systems is not great.

System 2 (Existing/Committed) was ranked the third highest because it supports current 3Rs behaviours, and may encourage additional positive attitudes and perceptions. Costs of this system were acceptable to residents and municipalities if current subsidies continue.

System 5 (Wet/Dry) was ranked the third lowest. In the low-density areas of Metro Toronto, this system may be acceptable with strong participation and some increase in positive attitudes, although with some concerns about the convenience of the system. In Metro Toronto's high-density areas this system may meet negative attitudes and concerns about costs and low participation rates. The concerns would be focused primarily on the health, odour and nuisance effects of the "wet" stream and how it would be collected, managed and disposed in high-rise apartments. Apartment owners, managers and tenants may be very concerned about this system. Municipalities and residents may be concerned about the costs of this system.

System 1 (Existing) was ranked the second lowest. This system would only maintain or lead to a small increase in participation and positive attitudes and perceptions. Costs were acceptable to residents and municipalities if current subsidies continue.

System 6 (Mixed Waste Processing) was ranked the lowest. Due to the potential odour effects, there was likely to be significant opposition to a mixed solid waste composting and sorting facility. While the components of this were available to all households (equal to Blue Box) and it encourages 3Rs involvement, there would be the potential for the system to deter many people from source separation. The convenience of disposing of all waste, knowing that it will be separated elsewhere, may prompt residents to stop separating their waste. Furthermore, residents and municipalities may be less willing to pay for the higher costs of this system.

Service Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and criteria rankings, an overall system ranking was completed for the Service Criteria Group. Any system that received a mix of lowest and highest rankings for reliability and performance (the two top ranked criteria) were ruled out of contention as highest ranked systems. The ultimate ranking of these systems were then evaluated using social acceptability and flexibility.

Systems 6 (A+B) (Mixed Waste Processing with low and high quality compost) received a highest and second highest ranking for performance, but a lowest ranking for reliability, and was therefore eliminated from consideration as the highest ranked system. The same was true (in reverse) for the existing and the Existing/Committed systems.

Therefore Systems 3, 4, and 5 were compared to determine the highest ranked, and then the other two systems were ranked. System 4 (Expanded Blue Box) was ranked highest on social acceptability, second highest on reliability, and third highest on performance and was therefore the highest ranked system overall. System 3 (Direct Cost) was considered second highest ranked. It received a similar ranking to System 4 for reliability, but a lower ranking for performance and was also considered less socially acceptable. It also received a lower ranking than System 4 for flexibility (as it handles a narrower range of materials).

System 5 (Wet/Dry) received a higher ranking than Systems 3 and 4 (Direct Cost, Expanded Blue Box) for performance (due to its higher diversion potential) but a lower ranking on reliability. It was considered similar to System 3 (Direct Cost), receiving a second highest ranking for performance combined with a second lowest ranking for

reliability. System 3 (Direct Cost) was second highest ranked for reliability, and second lowest ranked for performance. These two systems were considered equal, based on the two most important criteria, and were then compared using other criteria. System 3 (Direct Cost) was second highest ranked for social acceptability, whereas System 5 (Wet/Dry) was second lowest ranked. System 5 (Wet/Dry) was second highest ranked for flexibility, compared to System 2 (Existing/Committed) which was second lowest ranked. Because social acceptability was considered more important than flexibility, System 3 (Direct Cost) was ranked higher than System 5 (Wet/Dry). Therefore System 3 (Direct Cost) was second highest ranked, and System 5 (Wet/Dry) was third highest ranked.

System 2 (Existing/Committed) was considered third lowest ranked. This ranking was determined by comparing System 2 to System 5. System 2 was more socially acceptable than System 5, but because it received a lowest ranked ranking for performance (one of the two most important criteria) it was ranked lower than System 5.

System 1 (Existing) was ranked higher than Systems 6A and 6B (the lowest ranked), but received low rankings for performance, social acceptability and flexibility. Its diversion potential was estimated at 21 to 26%, which is significantly below the provincial 50% target. It was therefore considered the second lowest ranked system overall.

System 6 (A+B) (Mixed Waste Processing with low and high quality compost) were ranked lowest overall. While they received second highest rank and on performance (for Systems 6A and 6B respectively), they were each considered lowest ranked on reliability (a top criterion) and social acceptability. Both were considered highest ranked for flexibility, but this is the criterion considered of least importance.

In summary, the system ranking under the Service Criteria Grouping for Metro Toronto was (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 5 (Wet/Dry)
4 - System 2 (Existing/Committed)
5 - System 1 (Existing)
6 - Systems 6 (A+B) (Mixed Waste Processing)

8.3.2.5 Social Environment Criteria Group (Metro Toronto)

The system rankings by criterion were based on the "system net effects by criteria" and "advantages/disadvantages by criteria" contained in the individual system summary net effects tables contained in the Social Environment Technical Appendix. The system net effects were determined based on the successful application of mitigation/enhancement measures to the potential effect. The key "advantages/disadvantages" were listed for each criterion for each system in comparison to the other systems.

Net effects common to all systems were not carried forward to the comparative evaluation of the system options because they did not assist in distinguishing among systems. Although the systems were named for the dominant element of the system (e.g., Expanded Blue Box) the evaluation was based on the entire system and all of its components as described in Section 6.6. The system rankings for the three Social Environment Criteria are discussed below and summarized in Table 8.14. The overall system rankings can be found in the top row of Table 8.14.

Potential Local Community Impacts

Potential Local Community Impacts could be anticipated as a result of siting new 3Rs facilities and due to expansion and increased use of existing facilities and non-optimal operating conditions. The potential effects of expanded use of existing facilities were taken to be the same for Systems 1, 2, 3 and 4.

System 1 (Existing) had all of the necessary facilities in place while the other systems required expansion of or new facilities. As a result, System 1 was the highest ranked system.

Systems 2 (Existing/Committed), 3 (Direct Cost) and 4 (Expanded Blue Box) were ranked as the second highest because they all required the same new facilities (Metropolitan Toronto has planned for most of the facilities required for these systems). The difference in impacts were attributable to the expanded use of those facilities. Although there was likely to be additional volumes of materials handled at the facilities in Systems 3 and 4, the materials would be mainly dry and the importance of the potential social effects was uncertain. Although there was the potential for social impacts from illegal dumping to occur with System 3, the significance of the impacts was uncertain.

TABLE 8.14

METRO TORONTO
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
IMPACT						
Social Environment (Overall Ranking)	Second lowest ranked	Second highest ranked	Second highest ranked	Highest ranked	Third highest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · no new facilities required · potential effects are due to increased use of existing facilities	Second highest ranked due to: · Systems 2,3,4 and 5 have the same facilities; potential for displacement and disruption effects due to expanded use of existing facilities and the MRFs, centralized composting facility and one recycling facility · potential effects are likely less important than Systems 5 and 6, but more than System 1	Second highest ranked due to: · Systems 2,3,4 and 5 have the same facilities; potential for displacement and disruption effects due to expanded use of existing facilities and the MRFs, centralized composting facility and one recycling facility · potential effects are likely less important than Systems 5 and 6, but more than System 1 · potential for effects from illegal dumping by residents (magnitude uncertain)	Second highest ranked due to: · Systems 2,3,4 and 5 have the same facilities; potential for displacement and disruption effects due to expanded use of existing facilities and the MRFs, centralized composting facility and one recycling facility · potential effects are likely less important than Systems 5 and 6, but more than System 1	Second lowest ranked due to: · Systems 2,3,4 and 5 have the same facilities; potential for displacement and disruption effects due to expanded use of existing facilities and the MRFs, centralized composting facility and one recycling facility · potential displacement and disruption may be more significant than Systems 1-4, but less than System 6 due to additional volumes of material and food waste · potential health concerns associated with centralized composting for wet stream	Lowest ranked due to: · greatest potential for displacement and disruption of residents, community features and disruption of community due to new mixed waste processing and composting facility · potential for health concerns associated with processing and composting facility

TABLE 8.14

METRO TORONTO
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued))

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Potential for Broad Social Impact	Lowest ranked due to: · unlikely to maximize potential for lifestyle change · limited potential for additional employment and economic development in the short or long-term · most convenient System for residents (with System 2)	Second highest ranked due to: · potential to increase but not maximize the potential for lifestyle change · potential for some additional employment and economic development in the short and long-term · slightly less convenient for residents than System 1	Second highest ranked due to: · potentially fosters greater awareness of benefit of 3Rs and should encourage change to more sustainable lifestyle · some potential additional employment and economic development in the short and long-term. · potential increase in illegal disposal by households · potentially less convenient than Systems 1 and 2.	Highest ranked due to: · potential for residents to participate more effectively in source separation than other Systems due to familiarity · potentially will increase but not maximize the potential for lifestyle change · potential for additional employment and economic development in the short and long-term · potential for greater inconvenience than System 1,2 and 3 (considered low effect)	Third highest ranked due to: · potential for increased economic development with more reliable supply of materials for recycling industries with less contamination than mixed waste · uncertain if the System will maximize positive lifestyle change (could reduce the participation in source separation) · potential for greater inconvenience than System 1, 2, 3 and 4. Variety of lifestyle inconveniences associated with larger bins. · appears to be difficult to implement in high density households. · potential inconveniences for elderly and disabled with wet/dry bins	Third highest ranked due to: · potential for increased economic development with more reliable supply of materials for recycling industries · however potential for greater contamination of the recyclable and compost streams than the other Systems · unlikely to maximize positive lifestyle change · may reduce the amount of household source separation

TABLE 8.14

METRO TORONTO
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued))

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Distribution of Social Costs and Benefits	Lowest ranked due to: · potentially least positive effect on future generations · least positive effect on distribution between household types · least negative distribution effects due to facilities	Second highest ranked due to: · potentially second least positive effect on future generations · potentially more equitable distribution of 3Rs services between housing types than System 1, but less than Systems 3-6. · potentially second least negative distribution effects due to facilities	Second highest ranked due to: · potential increased financial burden for large households · potential for positive benefit to future generations, magnitude uncertain but should have greater benefit than Systems 1 and 2 (depends on amount and effects of illegal dumping) · second least negative distribution effects due to expanded use of facilities · application to multi-family household uncertain (System assumes only 40% affected)	Highest ranked due to : · potentially positive distributional effects for current and next generation with continuing growth in changes to 3Rs lifestyle/behaviour and current generation and individuals taking greater responsibility for managing their resources · more equitable distribution of 3Rs opportunities among housing types · second least negative distribution effects due to facilities	Third highest ranked due to: · more significant negative distribution effects due to facilities · potential for significant benefit to future generation from higher volumes of waste diverted but may have negative effect on future 3Rs behaviour · improved distribution effects by providing 3Rs service to more people than Systems 1, 2 and 3 · uncertain of the application to multi-family	Third highest ranked due to: · improved distribution effects by providing 3Rs service to more people than Systems 1,2 and 3 · most significant negative distribution effects due to facilities · potential for benefit to future generation from highest volumes of waste diverted but may have negative effect on future 3Rs behaviour from reduced participation in source separation

The difference in potential effects of Systems 2, 3, and 4 (Existing/Committed, Direct Cost, Expanded Blue Box) compared to System 5 (Wet/Dry) would likely be small. System 5 was ranked second lowest because of the increased volumes of all types of materials, and the addition of food waste to the composting stream. The health and odour issues associated with the composting facility may be more significant than with the other systems.

System 6 was lowest ranked due to the requirement for a Mixed Waste Processing and composting facility and the attendant odour effects and health issues.

Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social impacts on the Region's broad social environment in terms of the lifestyle of people, and the employment and economic development opportunities in the Region over the planning period.

System 4 (Expanded Blue Box) was the highest ranked because it had the potential for residents to: participate more effectively in source separation due to their familiarity with the system; contribute to effecting lifestyle change; and potential for additional employment and economic development from the support of recycling and green industries. There was the potential for greater inconvenience with System 4 (Expanded Blue Box) than Systems 1, 2 and 3 (Existing, Existing/Committed, Direct Cost) but as most people are likely willing to take on some inconvenience for actions that they think would improve the environment, this was not considered significant. Systems 3, 5 and 6 (Direct Cost, Wet/Dry, Mixed Waste Processing) have a greater potential for faulty source separation, both deliberate and inadvertent. Systems 1 (Existing) and 2 (Existing/Committed) did not provide as much source separation opportunity to as many people. System 4 (Expanded Blue Box) also had greater potential for additional employment and economic development than systems 1, 2 and 3 (Existing, Existing/ Committed, Direct Cost) due to a more reliable supply of materials for recycling and "green" industries.

Systems 2 (Existing/Committed) and 3 (Direct Cost) were ranked the second highest. System 3 should be effective in low density areas because by charging for garbage disposal, residents were given an incentive to source separate more consistently. It should help encourage a change in lifestyle that incorporates 3Rs behaviour (and adapts to government policy). It should also increase the opportunities for employment and economic development over Systems 1 (Existing) and 2 (Existing/Committed). However,

in System 3 (Direct Cost) there was a potential for some residents to engage in illegal dumping to reduce the amount of waste for which they have to pay collection costs. The application of Direct Cost in apartment buildings was uncertain; it did not represent an additional incentive to apartment dwellers to recycle and therefore would not lead to increased materials. System 2 (Existing/Committed) had limited economic and employment and development opportunities, and limited support of a change in lifestyle to more personal involvement of residents in managing their wastes. However, it would be convenient for residents, feasible in high density areas and the costs should be acceptable to apartment owners/managers.

Systems 5 (Wet/Dry) and 6 (Mixed Waste Processing) were ranked the third highest because they have the potential to increase employment and economic development by providing a more reliable supply of materials to recycling and "green" industries, although System 5 has less potential for contamination than System 6. However, it was uncertain as to whether System 6 would achieve a change in lifestyle. The opportunity still exists for residents not to separate their recyclables and compostables, but instead to put them into the garbage stream. It was uncertain how effective System 5 would be in apartment buildings. In addition, System 5 was likely to have greater potential effects on special/sensitive groups (eg., elderly and disabled) due to the requirement for all people to use 90 gallon bins for their waste and separated materials.

System 1 (Existing) was the lowest ranked. Although it was the most convenient system, it has the least potential for lifestyle change and for employment and economic development in the short and long-term.

Distribution of Social Costs and Benefits

Potential distributional effects were predicted to occur as a result of lifestyle changes of some groups in the Region and of future generations. System 4 (Expanded Blue Box) was determined to be the highest ranked due to its overall positive current and future generation effects. It provides 3Rs service to more people than Systems 1, 2 and 3 and provides more equitable distribution of 3Rs services among housing types by providing composting opportunities to multi-family households. It continues the growth in changes to 3Rs lifestyle/behaviour that should have greater benefit to future generations than Systems 1, 2, and 3 and had fewer negative distribution effects than Systems 5, and 6 over the planning period due to fewer facilities being required.

Systems 2 (Existing/Committed) and 3 (Direct Cost) were ranked equally as the second highest. They have the second least negative distribution effect from facilities and

provide 3Rs service to a greater proportion of households than System 1 and are feasible in high density areas. System 3 improved the distribution of 3Rs service over Systems 1 and 2 by providing the opportunity to participate in 3Rs activities to a higher proportion of households, but it provided a lower distribution of service than System 5, because it would only apply to about 18% of multi-family households. System 3 had the potential for an increased financial burden for large households. This system also had the second least negative distributional effects from facilities.

Systems 5 (Wet/Dry) and 6 (Mixed Waste Processing) were ranked equally as the third highest based on the uncertainties associated with the significance and magnitude of the different potential effects of the systems. System 5 had a greater potential for negative distributional effects of new facilities than systems 1, 2, 3 and 4. System 6 had the greatest potential for negative distributional effects from facilities. The magnitude of effect on future generations by both systems may be improved over other systems, because of greater recycling, however there was a concern that System 6, and to a lesser extent System 5, may allow residents to not source separate and that a Wet/Dry system in apartment buildings would be negatively received, with long term negative perceptions to 3Rs activities. System 6 however appears suitable to apartment buildings.

System 1 (Existing) was lowest ranked because it was likely to have the lowest positive distribution effects on future generations by not encouraging as significant a change in the lifestyle of the current generation toward greater personal involvement in the management of their wastes. It also did not provide as great an improvement in the distribution of 3Rs service to residents as the other systems do. However, it did have the least negative distribution effects due to facilities.

Social Environment Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and the criteria rankings (noting that all criteria were ranked equally), an overall system ranking could be completed for the Social Environment Criteria Group based on a qualitative evaluation. The evaluation considered trade-offs among the rankings for each system and criterion recognizing that there may be significant potential effects from the 3Rs systems and the potential effects for each criterion may occur throughout the life of the system and some may continue beyond the planning period. The overall rankings are provided at the top of Table 8.14.

System 4 (Expanded Blue Box) was the highest ranked system overall. It was ranked highest for the criteria of potential for broad social impact and distribution of social costs and benefits and second highest for the potential local community impacts.

Systems 2 (Existing/Committed) and 3 (Direct Cost) were ranked second highest overall based on their second ranking in all three criteria.

System 5 (Wet/Dry) was ranked third highest on the basis that it was second highest ranked for the distribution of social costs and benefits and third highest ranked system for broad social impact criteria. It ranked as the second lowest for Potential Local Community Impact. These rankings, overall, provided input to a ranking of System 5 higher than either System 1 or 6 (Existing, Mixed Waste Processing).

System 1 was ranked as the second lowest primarily because it ranked lowest for the broad social impact and distribution of social costs and benefits with this disadvantage being off-set by a highest ranking for potential local community impact.

System 6 was ranked lowest because it was ranked as lowest for the local community impact, second lowest for broad social impact and third highest for distribution of social costs and benefits. In comparison to the other systems, System 6 consistently ranked lower than the other systems.

The following summarizes the Metro Toronto 3Rs system rankings from the Social Environment perspective (highest ranked to lowest ranked).

1	-	System 4 (Expanded Blue Box)
2	-	System 2 (Existing/Committed)
2	-	System 3 (Direct Cost)
4	-	System 5 (Wet/Dry)
5	-	System 1 (Existing)
6	-	Systems 6 (A+B) (Mixed Waste Processing)

8.3.3 York Region Systems Evaluation

8.3.3.1 Cost Criteria Group (York Region)

The Cost Criteria Group contained only one criterion, which was the cost per household for the waste management system (diversion and disposal) which is based on 1992 dollars. This is estimated for all systems using 1992 waste quantities and unit rates for illustrative and comparative purposes).

This indicator is based on the costs of the waste diversion system and the waste disposal system (in $/year) and dividing the sum of these costs by the total number of households in each Region. It provided a measure of how different diversion systems compare, when waste management factors were taken into account.

A number of diversion system cost indicators (e.g. cost/hh/year for the diversion system, costs/tonne diverted, etc.) were considered, but were found to be of little value unless system costs were considered.

Cost Criteria Group - Overall System Ranking

Table 8.15 summarizes system cost per household data for the Region of York.

Systems 1 to 4 ranked highest equally with system costs (measured as cost/household/year) in the $124 to $128/household/year range, if disposal costs of $40/tonne were assumed, and $147 to $163/hh/year if disposal costs of $80/tonne were assumed. Within the accuracy level of this study, these costs were considered equal.

System 5 (Wet/Dry) had a larger range of potential costs, due to the uncertainty of three-stream collection costs. At the lower collection cost it compared to Systems 1 to 4, at the higher collection cost, it compare with System 6B. For cost ranking, System 5 was presented as two sub-systems, System 5A which had a high collection cost, and was ranked lowest, and System 5B, which had a low collection cost, and was ranked highest.

TABLE 8.15

YORK REGION
NET EFFECTS SUMMARY FOR COST

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5A Wet/Dry (high collection cost)	System 5B Wet/Dry (low collection cost)	System 6A Mixed Waste Processing (Unsuccessful)	System 6B Mixed Waste Processing (Successful)
IMPACT								
Cost (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Lowest ranked	Highest ranked	Lowest ranked	Lowest ranked
Cost per household (system)	Highest ranked due to: · $128-163/hh/yr	Highest ranked due to: · $128-163/hh/yr	Highest ranked due to: · $124-148/hh/yr	Highest ranked due to: · $126-147/hh/yr	Second highest ranked due to: · $192-207/hh/yr	Highest ranked due to: · $134-151/hh/yr	Lowest ranked due to: · $214-229/hh/yr	Lowest ranked due to: · $205-210/hh/yr

System 6 (Mixed Waste Processing) is the lowest ranked, with an overall system costs of $205 to $210/household/year, if the mixed waste system produces a high quality compost, and $214 to 229/household/year if the compost quality is poor (i.e. greater quantities of material from the mixed waste plant are landfilled due to limited end use opportunities).

The following summarizes the system ranking with respect to cost for York Region (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
1 - System 3 (Direct Cost)
1 - System 4 (Expanded Blue Box)
1 - System 5B (Wet/Dry)
6 - System 5A (Wet/Dry)
6 - System 6 (Mixed Waste Processing)

8.3.3.2 Municipal Finance Criteria Group (York Region)

The following describes York Region system rankings for the Municipal Finance Criteria Group. The individual system rankings are presented first by criteria and are followed by overall criteria group rankings.

Potential for Impacts on Local Tax Payers

The following describes the system net effects on the local taxpayer taking into account both total additional tax levy and the household tax effect. As outlined in Table 8.16, Systems 1, 2 and 3A (Existing, Existing/Committed and Direct Cost [revenue neutral]) were highest ranked with a tax per household ranking from $10-$12. The second highest ranked system was System 4 (Expanded Blue Box) which is expected to result in a tax per household of $17, representing a 2% increase. System 6 (A+B) (Mixed Waste Processing) was the lowest ranked and System 5 (Wet/Dry) was second lowest.

Potential for Impact of the Debt Burden of the Municipalities

The impact of the diversion commitment on the municipal capital program was found to be more significant than the tax impact. This analysis assumed that the full capital cost of future diversion commitments would be annualized at 9% over a 10 year period.

TABLE 8.16

YORK REGION
NET EFFECTS SUMMARY FOR MUNICIPAL FINANCE

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3A Direct Cost (revenue neutral)[1]	System 3B Direct Cost (added revenue)[2]	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste (low quality compost)	System 6B Mixed Waste (high quality compost)
IMPACT								
Municipal Finance (Overall Ranking)	Highest ranked	Second highest ranked	Second highest ranked	Third highest ranked	Third highest ranked	Second lowest ranked	Lowest ranked	Lowest ranked
Impact on Local Taxpayers	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Third highest ranked due to:	Second highest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Tax levy ($)	· 2,226,701	· 2,660,676	· 2,614,682	· 9,114,682	· 4,411,676	· 16,009,088	· 23,598,462	· 20,034,462
· Tax per household ($)	· 10	· 12	· 12	· 32	· 17	· 53	· 77	· 66
· Increase in taxation (%)	· 1%	· 1%	· 1%	· 3%	· 2%	· 5%	· 7%	· 6%
Impact on Municipal Debt Burden	Highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Third highest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Amount of debt ($)	· 0	· 2,785,000	· 2,785,000	· 2,785,000	· 10,000,000	· 45,000,000	· 57,785,000	· 57,785,000
· Debt payments ($)	· 0	· 434,000	· 434,000	· 434,000	· 1,558,000	· 7,012,000	· 9,004,000	· 9,004,000
· Debt capacity (%)	· 88%	· 88%	· 88%	· 88%	· 86%	· 75%	· 72%	· 72%
Impact on Municipal Reserves	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Total reserves ($)	· 0	· 0	· 0	· 6,500,000	· 0	· 0	· 0	· 0
· Reserves/household ($)	· 0	· 0	· 0	· 43	· 0	· 0	· 0	· 0
· Reserves/expenses (%)	· 0%	· 0%	· 0%	· 1%	· 0%	· 0%	· 0%	· 0%
Impact on Municipal Level of Service								
· Operating cost ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Expense/household ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
Impact on Private Sector Industries	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Private funding ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Costs ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Higher prices ($)	no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Private taxes (%)	1%	· 1%	· 1%	· 1%	· 2%	· 7%	· 11%	· 9%

1 Under the Direct Cost (revenue neutral) system, no additional revenue would be charged for waste and diversion collection purposes from the homeowners beyond what is now collected via municipal taxes.

2 Under the Direct Cost (added revenue) system, garbage bag chargees would be levied in addition to normal property taxes that include waste diversion and disposal collection costs.

On an overall basis, when all of the debt factors were combined, System 1 (Existing) represented the highest ranked system as it carried no additional capital costs. On the other hand, Systems 6 (A+B) (Mixed Waste Processing - high and low quality compost) were the lowest ranked because they incurred the highest capital costs. System 2 (Existing/Committed) and System 3 (A+B) (Direct Cost) were second highest ranked and, although they incurred high capital costs they affected York's financing to a lesser extent. System 4 (Expanded Blue Box) was the third highest ranked system followed by System 5 (Wet/Dry) representing the second lowest ranked system.

Potential Effect on Municipal Reserve Funds

System 3B (Direct Cost - added revenue) has the capacity of generating a further $6.5 million in extra revenue that could be placed into reserves and used for other waste management/waste diversion activities. As a result of this, System 3B (Direct Cost - added revenue) was highest ranked. Conversely, the remaining systems: System 1 (Existing), System 2 (Existing/Committed), the System 3A (Direct Cost - revenue neutral), System 5 (Wet/Dry), Systems 6 (A+B) (Mixed Waste Processing) and System 4 (Expanded Blue Box) were the lowest ranked even though they do not impact the reserve fund.

Potential for Impact on the Level of Municipal Services

As previously indicated, the annualized cost effect of the diversion systems had a low to medium impact on household taxation. Based on this, there was no reason to assume reductions in service in the other municipal departments to help fund diversion costs. As such, there was no impact on the functional service levels in the municipalities.

Potential for Impact on Private Sector Industries

The analysis did not take into account direct impacts on the private sector to offset costs related to the diversion systems because residential waste diversion will be paid for by taxes and other public sector funds. However, there is an indirect taxation effect whereby a portion of the diversion cost would be levied in local taxes.

While taxes currently collected from the business sector now approach $61.3 million, tax charges for each system range from 1% for System 1 (Existing), System 2 (Existing/ Committed) and System 3 (A+B) (Direct Cost) and 2% for System 4 (Expanded Blue

Box), 7% for System 5 (Wet/Dry) and 9% for System 6B (Mixed Waste Processing - low quality compost) and 11% for System 6A (Mixed Waste Processing - high quality compost system).

System 1 (Existing), System 2 (Existing/Committed), System 3 (A+B) (Direct Cost) and System 4 (Expanded Blue Box) were highest ranked. Conversely, System 6 (A+B) (Mixed Waste Processing) were lowest ranked due to the effect they would have on private sector taxes.

Municipal Finance Criteria Group - Overall System Ranking

The system rankings by criteria and indicators were based on the system net effects that are summarized above and contained in the Municipal Finance Technical Appendix. The net effects are summarized on Table 8.16. All criteria maintained an equal weighting and no one criteria carried more weight, or was more significant than others. By considering the relative magnitude of the effects for each of the criteria and indicators, an overall systems ranking could be completed for Municipal Finance Criteria Group. This is also summarized on Table 8.16.

The highest ranked system was System 1 (Existing). The Existing system would have the least cost impact on the tax payers in York Region and did not present significant debt costs to the financial structure. System 2 (Existing/Committed) and System 3A (Direct Cost - revenue neutral) were the second highest ranked systems. The Direct Cost (revenue neutral) and Existing/Committed systems impose a low cost per household and do not require significant capital costs. System 4 (Expanded Blue Box) and System 3B (Direct Cost - revenue added) were the third highest ranked.

Systems 6 (A+B) (Mixed Waste Processing) were the lowest ranked because they carry the highest tax effects and also the highest capital cost, and therefore debt. The second lowest ranked system was the System 5 (Wet/Dry) primarily as a result of its impact on debt capacity and local tax payers.

To confirm the overall ranking, the municipal finance criteria group also undertook a sensitivity analysis on key variables that may affect the criteria indicators. This analysis is presented in the Municipal Finance Technical Appendix. The sensitivity analysis examined variations in capital costs (plus or minus 10% and 20%), rates of waste diversion (plus or minus 5%), variations in operating cost differences (plus or minus 5% and 10%) in waste disposal costs per tonne for solid waste disposal and, finally, household growth which includes a no growth scenario. While utilizing the various

ranges of indicators presented above, the sensitivity analysis showed that, the general ranking of the systems presented above would not materially change.

On the basis of the Municipal Finance Criteria Group, the York Region systems were ranked as follows (highest ranked to lowest ranked):

1 - System 1 (Existing)
2 - System 2 (Existing/Committed)
2 - System 3A (Direct Cost [revenue neutral])
4 - System 3B (Direct Cost [added revenue])
4 - System 4 (Expanded Blue Box)
6 - System 5 (Wet/Dry)
7 - Systems 6 (A+B) (Mixed Waste Processing)

8.3.3.3 Natural Environment Criteria Group (York Region)

The system rankings by criterion were based on the "system net effects by criterion" and "advantages/disadvantages by criterion" documented in the Region of York's individual system summary net effects tables contained in the Natural Environment Technical Appendix. The system rankings for the three Natural Environment Criteria are discussed below. The system rankings, by criterion, are summarized in Table 8.17.

For the purpose of the systems evaluation with respect to the Natural Environment, Systems 6 (Mixed Waste Processing (A+B)) were considered to be the same. These system evaluations are combined and referred to as System 6.

Potential for Effects to Terrestrial Systems and Resources

Effects to terrestrial systems and resources were predicted to occur as a result of siting new 3Rs facilities and due to discharges of wastes or potentially harmful materials as a result of some accident or upset condition. The potential effects due to accidents was expected to be the same for all systems. The System 1 (Existing) has all of the required facilities in place. Potential effects are expected only as a result of accidents. The

TABLE 8.17

YORK REGION
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
IMPACT						
Natural Environment (Overall Ranking)	Highest ranked	Second highest ranked with System 4	Second lowest ranked	Second highest ranked with System 2	Third lowest ranked	Lowest ranked
Potential for effects to terrestrial systems and resources	Highest ranked due to: · necessary facilities already existing · potential effects are due to accidents	Second highest ranked due to: · potential effects due to siting two new central compost facilities · potential effects are due to accidents · new MRF and in-vessel compost facility being developed	Second lowest ranked due to: · potential effects due to siting two new central compost facilities · potential effects are due to accidents · higher likelihood of illegal dumping of wastes was anticipated and may result in effects · new MRF and in-vessel compost facility being developed	Second highest ranked due to: · potential effects due to siting two new central compost facilities · potential effects due to accidents · new MRF and in-vessel compost facility being developed	Third lowest ranked due to: · potential effects due to siting of new MRF (if required) and two new compost facilities · potential effects due to accidents · new MRF and in-vessel compost facility being developed	Lowest ranked due to: · potential effects due to siting two new central compost facilities and new mixed waste processing and composting facility · potential effects due to accidents · new MRF and in-vessel compost facility being developed

YORK REGION
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities	Second highest ranked due to: · potential effects due to siting new central compost facilities · potential effects due to discharges from existing facilities and new compost facilities · new MRF and in-vessel compost facility being developed	Second lowest ranked due to: · potential effects due to siting new central compost facilities · potential effects due to discharges from existing facilities and new compost facilities · new MRF and in-vessel compost facility being developed · higher likelihood of illegal dumping of wastes was anticipated and may result in effects	Second highest ranked due to: · potential effects due to siting new central compost facilities · potential effects due to discharges from existing and new composting facilities · new MRF and in-vessel compost facility being developed	Third lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting new MRF (if required) and compost facilities and discharges from new compost facilities · new MRF and in-vessel compost facility being developed	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting compost facilities, and mixed waste processing/composting facility and discharges from new compost and mixed waste facilities · new MRF and in-vessel compost facility being developed
Potential for effects to the atmospheric environment	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · composting of wet wastes at in-vessel compost facility · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · composting of wet wastes at in-vessel compost facility · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · composting of wet wastes at in-vessel compost facility · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Second lowest ranked due to: · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases · composting of wet wastes at in-vessel compost facility · additional emissions from increased wet waste composting	Lowest ranked due to: · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases · some wet wastes composted at in-vessel compost facility · additional emissions from mixed waste processing and composting

Existing system was ranked highest. The Existing/Committed and Expanded Blue Box systems (Systems 2 and 4, respectively) required 3Rs facilities in addition to those which already exist. These facilities included a new MRF and in-vessel compost facility which were already being developed as part of System 2 (Existing/Committed). Two additional central compost facilities were also part of these two systems. By siting these facilities in areas with compatible land uses (i.e. landfill sites, industrial areas) it was anticipated that potential effects to terrestrial systems and resources could be effectively mitigated. Systems 2 (Existing/Committed) and 4 (Expanded Blue Box) were considered to be both second highest ranked.

The Direct Cost (System 3) and Wet/Dry (System 5) systems both required the same new facilities as Systems 2 and 4. However, additional effects were anticipated for System 3 (Direct Cost) due to a higher likelihood of illegal dumping of wastes occurring. System 5 may require a new MRF to process a larger quantity of dry recyclables if the MRF now being developed cannot be expanded. The potential effects for System 5 were expected to be less than for System 3. If a new MRF was required, the potential effects could largely be mitigated through an appropriate site selection process. The illegal dumping of wastes was expected to occur during the operating life of the Direct Cost system, making this system ranked lower than System 5.

System 6 (Mixed Waste Processing) required a new mixed waste processing and composting facility in addition to the same new facilities identified for the Existing/Committed system. Due to the area typically required for a mixed waste facility, System 6 was predicted to have the highest potential for effects to terrestrial systems and resources.

Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

Similar to effects on terrestrial systems and resources, potential effects to aquatic systems were expected due to facility location, discharges from a facility and accidents. The largest potential for effects was expected to be a result of leachate or contaminated surface water runoff from central compost facilities. All systems were ranked equal with respect to effects as a result of discharges from existing facilities. System 1 (Existing), for which all the facilities exist, was highest ranked. System 2 (Existing/Committed) and System 4 (Expanded Blue Box) both would have a new MRF and in-vessel compost facility. These facilities are presently being developed. In addition, these systems also included two more central compost facilities. System 2 (Existing/ Committed) and System 4 (Expanded Blue Box) were both ranked second highest.

The Direct Cost (System 3) and Wet/Dry (System 5) systems include the same new facilities as System 2 (Existing/Committed) and System 4 (Expanded Blue Box). System 5 may require a new MRF if the facility presently being developed cannot be expanded. The effects of a new or expanded MRF on aquatic systems were not expected to be significant since only dry recyclables are processed. The likelihood of illegal dumping of wastes as a result of a Direct Cost system would result in increased effects to aquatic systems and water resources. System 3 (Direct Cost) was ranked lower than System 5 (Wet/Dry) and second lowest for this criterion.

System 6 (Mixed Waste Processing) required a new mixed waste processing facility in addition to the new facilities common to Systems 2 to 5. The potential effects on aquatic systems from this system were anticipated to be greater than any other system.

Potential Effects to the Atmospheric Environment

All six system alternatives were expected to have emissions to the atmosphere. These emissions include dust, bio-aerosols, odours and gases generated at MRFs and compost facilities, with dust and exhaust emissions generated by waste collection vehicles. There was no differentiation between systems based on these emissions. Emissions to the atmosphere were reduced by such measures as following proper operating procedures of the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. The potential for effects to the atmospheric environment from emissions was expected to be greater if wet waste (household organic) or mixed waste was being processed and/or composted at centralized facilities in large volumes. System 1 (Existing) did not include the management of wet wastes or mixed wastes. System 2 (Existing/Committed), System 3 (Direct Cost) and System 4 (Expanded Blue Box) included the composting of a small annual quantity of wet wastes at an in-vessel compost facility. Due to the type of facility and small quantities, no appreciable difference in emissions to the atmosphere was expected between Systems 1 to 4. These systems were all highest ranked. The Wet/Dry system (System 5) was ranked lower than these systems due to the substantive increase in the quantities of wet waste composted. The Mixed Waste Processing system (System 6) was ranked lowest due to the nature of the wastes and the processing method being typically open to the surrounding atmosphere.

Natural Environment Criteria Group - Overall System Ranking

When considering the ranking of systems by criterion and the criteria rankings together, an overall system ranking could be completed for the Natural Environment Criteria Group.

The Existing system (System 1) was ranked highest for each of the three criteria. As a result, this system was highest ranked overall. System 2 (Existing/Committed) and System 4 (Expanded Blue Box) were ranked equal and second highest. These systems were ranked lower than System 1 (Existing) due to potential effects to terrestrial systems and resources, and aquatic systems and water resources, from siting new 3Rs facilities and potential discharges for existing and new compost facilities. System 5 (Wet/Dry) was ranked slightly lower than Systems 2 and 4 and third least lowest overall. This system may require a MRF in addition to the same facilities included in System 2 (Existing/Committed) and System 4 (Expanded Blue Box). This new facility may result in additional effects to both terrestrial and aquatic systems.

The Direct Cost system (System 3) was ranked second lowest of the systems. This system requires the same new 3Rs facilities as Systems 2 (Existing/Committed) and 4 (Expanded Blue Box). However, this Direct Cost system had a higher likelihood of illegal dumping of wastes, resulting in additional effects to terrestrial systems and aquatic systems. The Direct Cost system was also ranked lower than Wet/Dry since the effects of illegal dumping were considered to be more significant than the potential effects of another new MRF (if required) and the increased emissions to the atmosphere from increased wet waste composting. Wet waste was composted in an in-vessel facility for both systems but at increased quantities in System 5 (Wet/Dry).

System 6 (Mixed Waste Processing) was the lowest ranked system for all three criteria and consequently was ranked lowest overall. This system required the greatest number of new 3Rs facilities resulting in a higher potential for effects to terrestrial systems and aquatic systems. Potential effects to the atmospheric environment from Mixed Waste Processing were also considered to be greater than emissions from any of the other five systems.

The following summarizes the York Region system ranking from the perspective of the Natural Environment Criteria Group (highest ranked to lowest ranked):

1 - System 1 (Existing)
2 - System 2 (Existing/Commercial)
2 - System 4 (Expanded Blue Box)
4 - System 5 (Wet/Dry)
5 - System 3 (Direct Cost)
6 - Systems 6 (A+B) (Mixed Waste Processing)

8.3.3.4 Service Criteria Group (York Region)

The "Service" Criteria Group contains four criteria. These are:

- Reliability;
- Flexibility;
- Performance; and
- Social Acceptability.

The system rankings by criteria for the Service Criteria Group for York Region are presented in Table 8.18, along with a summary of the rationale.

Reliability

The reliability of each system was judged according to whether the technologies which form the system had been proven reliable and had operated successfully in at least one jurisdiction in the world at full scale for a period of at least one year. The issue of whether the system is dependent on the success of a single approach was also considered. Single approach systems are more susceptible to collapse in the event of failure of any of the parts.

Since the technology has been proven (specifically for the Region of York) and the systems are diverse, Systems 1 and 2 (Existing and Existing/Committed) were judged to be equal and highest ranked. Systems 3 and 4 (Direct Cost and Expanded Blue Box respectively) were equal, and second highest ranked. System 3 (Direct Cost) was based on an approach that was proven in North America and it was based, to a degree, on reliance on a single approach.

System 4 (Expanded Blue Box) was also based on proven technology, as it had proven successful in Centre and South Hastings in Ontario and it relied extensively on public participation for its success. Also, some Region of York residents (in Markham) are presently participating in a partially expanded program which has been successful.

TABLE 8.18

YORK REGION
NET EFFECTS SUMMARY FOR SERVICE

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
IMPACT							
Service (Overall Ranking)	**Second lowest ranked**	**Third lowest ranked**	**Second highest ranked**	**Highest ranked**	**Third highest ranked**	**Lowest ranked**	**Lowest ranked**
Reliability	Highest ranked due to: · technologies presently exist and are proven · success was not due to reliance on single approach	Highest ranked due to: · technologies presently exist and are proven · success was not due to reliance on a single approach	Second highest ranked due to: · technologies presently exist and are proven · success was not due to reliance on a single approach · success partially dependent on participation in additional source separation by residents	Second highest ranked due to: · technologies presently exist and are proven · success was not due to reliance on a single approach · markets may be limited for some materials	Second lowest ranked due to: · technology proven in Europe but not yet in North America at full scale · relies on significantly increased public participation	Lowest ranked due to: · unproven technology that is not fully successful anywhere in North America at present · applies single approach to third bag of waste · recovered materials of poorer quality - creates marketing problems · compost of poor quality and is landfilled	Lowest ranked due to: · unproven technology that is not fully successful anywhere in North America at present · applies single approach to third bag of waste · recovered materials of poorer quality - creates marketing problems

TABLE 8.18

YORK REGION
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Flexibility	Lowest ranked due to: · flexibility limited at present by range of dry materials accepted, and inability to divert significant quantities of organics · nothing committed that will provide for increased diversion	Lowest ranked due to: · nothing committed that will provide for increased diversion · low percentage of multi-family dwellings means not much opportunity to increase diversion through their inclusion · new MRF will merely replace 2 existing facilities	Second lowest ranked due to: · basic compatibility with Existing system · additional quantities of materials generated would be processed in new MRFs · collection of wet wastes not provided	Third highest ranked due to: · compatibility with Existing system · could phase project in gradually · uses basis of Existing/Committed system. · new MRF would have to have capacity to process wider range and larger quantity of materials	Second highest ranked due to: · collection of wider range and greater quantity of materials: (including wet waste and others not captured in residential blue box programs) · proposed MRF in existing/ommitted will have to provide capacity to process additional secondary materials	Highest ranked due to: · ability to handle full range of wastes generated · provides ability to divert both wet and dry wastes not compatible with Existing/Committed system · compatible with existing collection system	Highest ranked due to: · ability to handle full range of wastes generated · Compatible with existing collection system
Performance	Lowest ranked due to: · limited waste diversion of only 28% or up to 33% with source reduction over time	Lowest ranked due to: · limited waste diversion of only 28% or up to 33% with source reduction over time	Second highest ranked due to: · waste diversion of 44% or up to 55% with source reduction over time	Second highest ranked due to: · waste diversion of 49% or up to 61% with source reduction over time	Highest ranked due to: · waste diversion of 61% or up to 70% with source reduction over time	Highest ranked due to: · waste diversion of 60% or up to 68% with source reduction over time	Highest ranked due to: · waste diversion of 78% to 84%

TABLE 8.18

YORK REGION
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability	Second lowest ranked due to: · maintain or small positive increase in 3Rs behaviour · no changes to the system; residents are familiar with it · not likely to encourage greater individual action · costs acceptable to residents and municipalities if current subsidies continue · reduction and reuse not emphasized to the same extent as other systems (no education programs)	Third highest ranked due to: · potential for only small positive increase in 3Rs behaviour · no changes to the system for households except for the addition of apartment recycling; residents are familiar with it · not likely to encourage greater individual action · costs acceptable to residents and municipalities if current subsidies continue · reduction and reuse are not emphasized to the same extent as other systems	Second highest ranked due to: · potential to encourage greater participation by individuals by source separating more materials for recycling and composting and with more households provided with composters · potential for controversy for some municipalities in the short term · potential for controversy reduced if education and consultation program implemented and appropriate user pay options selected for the Region	Highest ranked due to: · residents and municipalities are familiar with the system; infrastructure is in place · suitable to the low density character; education program would be targeted to different language or cultural groups · costs are acceptable if current level of subsidies continue. If not, municipal costs may not be acceptable and service may be reduced, decreasing the effectiveness of the system	Third highest ranked due to: · suitable for the low density urban areas of York · ethnic homogeneity suggests more efficient education/ promotion program · potential for less contamination of recyclables than mixed waste processing · application to and acceptance in apartments and rural areas uncertain (about 20% of population) · potential for reduced acceptability due to potential nuisance effects from large volumes of food waste at the composting facility · potential for reduced participation by some groups due to greater difficulty using 90 gal. bins and greater inconveniences (eg. elderly and rural residents) pay for the system	Lowest ranked due to: · potential for processing and composting facility operation likely to be unacceptable · system does not encourage source separation; could reduce participation in blue box and household composting · residents and municipalities are unwilling/unable to pay for the high capital costs · potential for higher contamination of recyclables than the other systems may reduce the usability of the recyclables	Lowest ranked due to: · potential for processing and composting facility operation to be unacceptable · system does not encourage source separation; could reduce participation in blue box and household composting · residents and municipalities are unwilling/unable to pay for the high capital costs · potential for higher contamination of recyclables than the other systems may reduce the usability of the recyclable

YORK REGION
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability (continued)			· difficult to implement user pay and composting in high density housing; unlikely to significantly increase participation in high rises (represent a low proportion of households in York) · potential for illegal dumping		· residents may not separate high proportion of food waste, particularly in winter · at the higher costs residents and municipalities may be unwilling or unable to pay for the system		

System 5 (Wet/Dry) was ranked second lowest as it relied on extensive public participation and while technology was proven, it had not been proven on a full scale in a large jurisdiction anywhere in Ontario or North America, and may be limited in its ability to include multi-family buildings. Because Region of York has a low percentage of multi-family households, this was not considered a significant limitation of the system. Extensive research had been carried out on wet-dry systems in the Regions of Peel, Halton and Metro Toronto through a series of pilot projects carried out on an on-going basis for the last two years. Some communities in York (Markham, Newmarket) are aggressively pursuing Wet/Dry projects, and hope to have systems in place in the near future.

Systems 6 (A+B) (Mixed Waste Processing with high and low quality compost) were ranked equally and lowest because they were based on a technology that is somewhat unproven to have operated successfully anywhere in North America using the four following criteria for Mixed Waste Processing, which are:

- successful operation at full-scale for one year;
- no plant shutdowns due to operational problems;
- successful, sustainable markets for secondary materials recovered; and
- successful end uses/markets for finished compost.

Systems 6 (A+B) rely on a single approach for the "third bag" of waste. This approach is being abandoned in Europe, having been used there for processing of municipal waste for the last 40 years.

Flexibility

System flexibility was judged according to the types and quantities of waste accommodated and compatibility with the Existing system. This criterion incorporates the ability of the system to adapt to changing waste characteristics and quantities.

Systems 6 (A+B) (Mixed Waste Processing with high and low quality compost) were judged to be highest ranked because they could handle the full range and quantity of residential materials generated in Region of York. Although there was some question about the ultimate fate of secondary materials from Mixed Waste Processing plants, both systems were judged to be compatible with the existing collection system and to lead to significantly increased waste diversion.

System 5 (Wet/Dry) was judged to be second highest ranked as it collects a wider range and greater quantity of dry materials that are not regularly collected in Blue Box

programs. The proposed MRF in the Existing/Committed system is likely to provide the capacity to process the expanded list of dry materials recovered by this system. Composting facilities being proposed in the Region by private sector companies could likely provide the organic processing capacity required for this system. These have not been included in the assessment at this time as their status was somewhat uncertain. System 5 (Wet/Dry) provides the capacity to divert significant quantities of wet household waste which cannot be diverted by Systems 1 to 4. This system had greater flexibility than Systems 1 to 4, as it could divert a significant quantity of wet household (food) wastes.

System 4 (Expanded Blue Box) was judged as third highest ranked. While it collects a wider range and quantity of dry materials and was compatible with the Existing/ Committed system, the overall projected quantities of materials collected were lower than in some systems. In addition, it did not have the flexibility to divert significant quantities of wet materials. Some York communities (e.g. Markham) currently collect most of the list of Expanded Blue Box materials, hence System 4 (Expanded Blue Box) would not require a change in behaviour for some residents.

System 3 (Direct Cost) was ranked second lowest. It was compatible with the Existing system and the new MRF can process the additional quantities of materials that the system would generate. System 2 (Existing/Committed) was lowest ranked along with System 1 (Existing), because of the limited range and quantities of materials it could divert.

Performance

System performance was judged according to the amount of material diverted by each system, expressed as a percentage of the waste generated. For diversion estimates it was assumed that markets would exist for all recovered materials.

System 6B (Mixed Waste Processing [high quality compost]) was highest ranked because it significantly increased the amount of material diverted. For this system, it was assumed that markets/end uses could be found for all of the finished compost, resulting in an overall diversion rate of up to 84%. System 6A (Mixed Waste Processing with low quality compost) was highest ranked along with System 5 (Wet/Dry). Both systems have the potential to divert 60% to 70% of the residential waste stream.

Systems 3 (Direct Cost) and System 4 (Expanded Blue Box) are ranked equally as second highest, with diversion potential in the 44% to 61% range. The range reflects some uncertainty in the level of source reduction achievable by the year 2000. This has been

estimated at 5% based on 1992 base case rates, for the purpose of this study. The level of participation in backyard composting was also somewhat uncertain. The higher diversion estimate assumes that 80% of single family households would divert up to 240 kg/hh/year, while the lower rate assumes that some households would average a reduced diversion rate of 100 kg/hh/year through backyard composting.

Systems 1 (Existing) and System 2 (Existing/Committed) were lowest ranked due to the lower level of material diverted. These systems were both estimated to divert 28% to 33% of the residential waste stream, which was below the provincial diversion target of 50%.

Social Acceptability

The social acceptability of each system was evaluated on the basis of the potential effects of the systems on participation, attitudes and perception of 3Rs activities and willingness to pay for the system. Based on these indicators, System 4 (Expanded Blue Box) was identified as the highest ranked system because residents and municipalities were familiar with the system components and infrastructure and could be expected to respond more quickly and more positively to the system. System 4 (Expanded Blue Box) is also suitable for the low density areas of York. In addition, all apartment buildings of more than 6 units will be provided with recycling service, providing an improved level of service to these residents likely encouraging greater participation. Costs are acceptable assuming current levels of subsidy continue.

System 3 (Direct Cost) was ranked the second highest because it has the potential to encourage greater participation in 3Rs than either Systems 1 (Existing) or 2 (Existing/Committed), the costs appear to be acceptable and it was suitable for low density urban and rural areas of York (all rural residents have "curbside" collection of garbage). The implementation of Direct Cost in apartments (about 11% of households) may be ineffective in encouraging greater participation than System 2 (Existing/Committed) due to implementation difficulties. System 3 (Direct Cost) had the advantage over System 2 (Existing/Committed) of potentially encouraging greater participation by individuals and greater behavioural change to support 3Rs in low density areas (about 89% of households). However, it may be controversial in some municipalities and there may be initial opposition from residents. An effective education and public consultation program may be required to identify and address the public concerns related to Direct Cost. Through the consultation program the best approach for the Region may be identified, including a corresponding reduction in taxes or a charge for extra bags per household.

Systems 1, 2 and 5 (Existing, Existing/Committed and Wet/Dry) were ranked as third highest. Systems 1 and 2 support the current 3Rs behaviour, and people are familiar with the system. However, they are unlikely to encourage greater individual or municipal behaviour to reduce, reuse or recycle their waste. Reduction and reuse were not emphasized to the same extent as the other systems. In addition, although these systems had a cost acceptability advantage over System 6 (Mixed Waste Processing), the cost for Systems 2, 3, 4 and 5 (Existing/Committed, Direct Cost, Expanded Blue Box and Wet/Dry) appeared to be equally acceptable.

System 5 (Wet/Dry) is more broadly based and has slightly more potential for greater participation. It has an advantage over Systems 1, 2 and 6 because it has greater potential to encourage stronger positive attitudes and behaviour toward the 3Rs. The acceptability of System 5 could be reduced due to odour and vermin effects from the volumes of food waste being composted at a composting facility. There is also increased potential for some groups to participate less due to greater difficulty in using the 90 gallon bins (e.g. elderly and disabled) and for others not to separate food waste (due to the messiness and inconveniences associated with the bins and cleaning them). In addition, the effectiveness of the Wet/Dry system in rural areas, representing about 20% of the population, is uncertain. At the higher cost for System 5, it may be less acceptable as residents and municipalities may be unwilling to pay the higher costs for the system.

System 6 (Mixed Waste Processing) was lowest ranked because the costs for the mixed waste processing and composting facility are likely to be unacceptable to residents and municipalities; it did not encourage source separation and could reduce individual participation in some of the components of the system (e.g. Blue Box); and, the mixed waste processing and composting facility operation is unlikely to continue to operate due to odour problems.

Service Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and criteria rankings, an overall system ranking was completed for the Service Criteria Group. Any system that received a mix of a lowest and highest ranking for reliability and performance (the two top ranked criteria) were ruled out of contention as the highest ranked systems. The ultimate ranking of these systems were then evaluated using social acceptability and flexibility.

Systems 6 (A+B) received the highest ranking for performance, but the lowest ranking for reliability, and were therefore eliminated from consideration as the highest ranked system. The same was true (in reverse) for the Existing system.

System 4 (Expanded Blue Box) was highest ranked on social acceptability, second highest ranked on reliability and performance, and was therefore the highest ranked system overall. System 3 (Direct Cost) was considered second highest ranked. It received a similar ranking to System 4 for reliability and performance, but was considered less socially acceptable. It also received a lower ranking than System 4 for flexibility (as it handles a narrower range of materials).

System 5 (Wet/Dry) was ranked third highest. System 5 received a higher ranking than Systems 3 and 4 for performance (due to its higher diversion potential) but a lower ranking on reliability. This combination results in the system being evaluated on other criteria. It was considered third highest ranked for social acceptability. It was considered more flexible than Systems 3 and 4, but because flexibility is less important, it received a third highest ranking.

Mixed Waste Processing Systems 6 (A+B) were lowest ranked overall. While they received a highest ranking on performance, they were each considered lowest ranked on reliability (a top criterion) and social acceptability. Both were considered highest ranked for flexibility, but this is the criterion considered of least importance.

Systems 1 and 2 (Existing and Existing/Committed) systems were ranked lowest for performance and highest for reliability. These were therefore considered equal to Systems 6 (A+B) for a highest and lowest score combination for these two criteria. They are considered more socially acceptable and less flexible than Systems 6 (A+B). Because social acceptability is considered a more important criterion, it was used to differentiate between the two systems. System 1 (Existing) was therefore considered second lowest ranked, and System 2 (Existing/Committed) third lowest ranked.

In summary, the system ranking for York Region under the Service Criteria Grouping was (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 5 (Wet/Dry)
4 - System 2 (Existing/Committed)
5 - System 1 (Existing)
6 - Systems 6 (A+B) (Mixed Waste Processing)

8.3.3.5 Social Environment Criteria Group (York Region)

The system rankings by criterion were based on the "system net effects by criteria" and "advantages/disadvantages by criteria" contained in the individual system summary net effects tables contained in the Social Environment Technical Appendix. The system net effects were determined based on the successful application of mitigation/enhancement measures to the potential effect. The key "advantages/disadvantages" were listed for each criterion for each system in comparison to the other systems.

Net effects common to all systems were not carried forward to the ranking of the system options because they do not assist in distinguishing among systems. Although the systems are named for the dominant element of the system (e.g., Expanded Blue Box) the evaluation was based on the entire system and all of its components as described in Chapter 7.0. The system rankings for the three Social Environment Criteria are discussed below and summarized in Table 8.19. The overall system rankings can be found in the top row of Table 8.19. For the purpose of the Social Environment evaluation, Systems 6 (A+B) were considered to be essentially the same and are referred to as System 6.

Potential Local Community Impacts

Potential Local Community Impacts could be anticipated as a result of siting new 3Rs facilities and due to expansion and increased use of existing facilities and non-optimal operating conditions. System 1 (Existing) had all of the necessary facilities in place while the other systems required expansion of existing facilities or new facilities. As a result, System 1 was considered the highest ranked system. The potential effects of expanded use of existing facilities were taken to be the same for systems 1, 2, 3 and 4.

TABLE 8.19

YORK REGION
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
IMPACT						
Social Environment (Overall Ranking)	Lowest ranked	Second lowest ranked	Second highest ranked	Highest ranked	Third highest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · no new facilities required · potential effects are due to increased use of existing facilities	Second highest ranked due to: · Systems 2 and 3 have the same facilities; potential for displacement and disruption effects due to expanded use of existing facilities and two new central composting facilities and 1 new MRF · potential for fewer people to be adversely affected than in Systems 5 and 6 · potential effects are likely less significant than Systems 5 and 6	Second highest ranked due to: · Systems 2 and 3 have the same facilities; potential for displacement and disruption effects due to expanded use of existing facilities two new central composting facilities and one new MRF · potential for fewer people to be adversely affected than in Systems 5 and 6 · potential for effects from illegal dumping/burning (magnitude uncertain)	Second highest ranked due to: · potential for increased displacement and disruption effects due to expanded use of existing facilities, expansion of new MRF and the addition of depots · potential for less displacement and disruption effects than Systems 5 and 6 but more than System 1, 2 and 3	Second lowest ranked due to: · potential for increased displacement and disruption effects due to expanded use of existing facilities (increased volumes), construction and operation of the expanded MRF and the additional depots · potential displacement and disruption effects may be more significant than Systems 1, 2, 3, and 4 · potential health concerns associated with centralized composting for wet stream	Lowest ranked due to: · greatest potential for displacement and disruption of residents, community features and disruption of community due to new mixed waste processing and composting facility · potential for health concerns associated with processing and composting facility

TABLE 8.19

YORK REGION
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Potential for Broad Social Impact	Lowest ranked due to: · unlikely to maximize potential for lifestyle change · limited additional employment and economic development in the short or long-term · most convenient system for residents	Second lowest ranked due to: · potential to increase but not maximize the potential for lifestyle change · potential for some additional employment and economic development in the short and long-term · potentially less convenient for residents than System 1	Second highest ranked due to: · fosters greater awareness of benefit of 3Rs and should encourage change to more sustainable lifestyle · some additional employment and economic development in the short and long-term. · potential increase in illegal disposal and incineration by households · potentially less convenient than Systems 1 and 2.	Highest ranked due to: · potential for residents to participate more effectively in source separation than other systems due to familiarity · would increase but not maximize the potential for lifestyle change · potential for additional employment and economic development in the short and long-term · potential for greater inconvenience than Systems 1,2,3 (considered low effect)	Second highest ranked due to: · potential for increased economic development with more reliable supply of materials for recycling industries with less contamination than mixed waste · uncertain if the system will maximize positive lifestyle change (could reduce the participation in source separation); but appears appropriate for the high proportion of single family dwellings. · potential for greater inconvenience than System 1, 2, 3 and 4. Variety of lifestyle inconveniences associated with larger bins	Second lowest ranked due to: · potential for increased economic development with more reliable supply of materials for recycling industries · however potential for greater contamination of the recyclable and compost streams than the other systems · unlikely to maximize positive lifestyle change · may reduce the amount of household source separation · potential for greater inconvenience than Systems 1, 2, and 3, if residents participate fully

TABLE 8.19

YORK REGION
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Distribution of Social Costs and Benefits	Lowest ranked due to: · least positive effect on future generations · least positive effect on distribution between household types · least negative distribution effects due to facilities	Second lowest ranked due to: · second least positive effect on future generations · more equitable distribution of 3Rs services between housing types than System 1 but less than System 3, 4, 5 and 6 · second least negative distribution effects due to facilities	Second highest ranked due to: · potential increased financial burden for large households · potential for positive benefit to future generations. Magnitude uncertain but should have greater benefit than Systems 1 and 2 (depends on effects of illegal dumping) · third least negative distribution effects, due to expanded use of facilities	Highest ranked due to : · improved distribution effects by providing improved 3Rs service over System 1, 2 and 3 · third least negative distribution effects due to expanded use of facilities · positive distributional effects for current and next generation with continuing growth in changes to 3Rs lifestyle /behaviour and current generation and individuals taking greater responsibility for managing their resources	Second highest ranked due to: · more significant negative distribution effects than System 1, 2, 3, and 4 due to facilities · potential for significant benefit to future generations from higher volumes of waste diverted but may have negative effect on future 3Rs behaviour · improved distribution effects by providing more improved 3Rs service than Systems 1, 2 and 3	Second lowest ranked due to: · improved distribution effects by providing 3Rs service to more people than Systems 1,2 and 3 · most significant negative distribution effects due to facilities · potential for benefit to future generation from highest volumes of waste diverted but may have negative effect on future 3Rs behaviour from reduced participation in source separation participation

Systems 2 (Existing/Committed) 3, (Direct Cost) and 4 (Expanded Blue Box) were ranked as the second highest systems because with the exception of depots for System 4, they all required the same new facilities. Although System 4 (Expanded Blue Box) had the potential for social effects from construction and operation of depots, the significance of the effect was uncertain. Therefore, similar potential effects are assumed. Although there was the potential for social effects from illegal dumping to occur with System 3, the significance of the effects was uncertain.

The difference in potential effect of Systems 2, 3, and 4 compared to System 5 is likely to be small. System 5 was ranked second lowest because of the likely addition of another MRF, the potential for greater odour effects associated with the "wet" waste at the composting facility and the increased volume of food wastes expected to be collected and composted. These additions may result in additional nuisance effects on residents and special/sensitive groups due to increased traffic and additional odour effects and health concerns.

System 6 was lowest ranked because the impacts on residents, special/sensitive groups, community features and businesses and the community associated with a Mixed Waste Processing and composting facility were expected to be more significant than the effects of MRF and composting facilities of Systems 2, 3, 4, and 5.

Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social effects on the Region's broad social environment in terms of lifestyle and the employment and economic development opportunities in the region over the planning period. System 4 (Expanded Blue Box) was found to be the highest ranked because it provides the potential for residents to continue to change their lifestyle in a way that is familiar to them while encouraging separation of a greater number of materials, more frequently and with less error than the other systems. It is easily implemented and suitable to the low density character of York Region. Systems 3, 5, and 6 have a greater potential for faulty source separation, both deliberate and inadvertent. Systems 1 and 2 do not provide as much source separation opportunity to as great a number of people. System 4 also had greater potential for additional employment and economic development than Systems 1 and 2 (and likely similar to System 3) due to a more reliable supply of materials for recycling and "green" industries.

Systems 3 (Direct Cost) and 5 (Wet/Dry) were ranked as the second highest systems. System 3 should encourage additional change to a lifestyle that incorporates higher levels of personal involvement by residents in the management of their wastes. In System 3,

there was a greater potential for some residents to engage in illegal dumping to reduce the amount of waste for which they have to pay collection costs. This disadvantage was off-set by the potential to provide greater incentive to practice 3Rs than System 5.

While both systems would increase the opportunities for employment and economic development over Systems 1 and 2, System 5 could be expected to have greater benefit by providing a more reliable supply of material to recycling and green industries with less contamination than System 6. However, it was uncertain whether the system will achieve a change in lifestyle in the region that incorporates personal involvement in the management of waste. The opportunity still exists for residents not to separate their recyclables and compostables, but instead to put them into the garbage stream. In addition, System 5 was likely to have greater potential effects on special/sensitive groups (e.g., elderly and disabled) due to the requirement for all people to use 90 gallon bins for their waste and separated materials. The effectiveness of both systems in apartment buildings was uncertain. In addition, there is uncertainty of the application of System 5 to rural areas which make up about 20% of residents.

Systems 6 was ranked the second lowest. System 6 had the greatest potential for employment and economic development through the supply of greater volumes of material for industries, but it may reduce the participation of residents in source separation and may not support further development of the 3Rs.

System 1 was lowest ranked because it had the potential for only a small positive increase in employment and economic development opportunities, and limited support of a change in lifestyle to more personal involvement of residents in managing their wastes. It was however, the most convenient system for residents.

Distribution of Social Costs and Benefits

Potential distributional effects were predicted to occur as a result of lifestyle changes on some groups in the region and on future generations. System 4 (Expanded Blue Box) was determined to be the highest ranked due to its overall positive effects on current and future generation. It provided 3Rs service to more people than Systems 1, 2 and 3. It continued the growth in changes to 3Rs lifestyle/behaviour that should have greater benefit to future generations than Systems 1, 2, and 3 and had fewer negative distribution effects than Systems 5, and 6 in the planning period due to fewer facilities being required.

Systems 3 (Direct Cost) and 5 (Wet/Dry) were ranked equally as the second highest ranked. System 3 improved the distribution of 3Rs service over Systems 1 and 2 by

providing the opportunity to participate in 3Rs activities to a higher proportion of households, but it provided a lower distribution of service than System 5. System 3 had potential for an increased financial burden for large households. System 5 had a somewhat greater potential for negative distributional effects of new facilities than Systems 1, 2, 3 and 4. For both systems the magnitude of effect on future generations was uncertain, but was likely to have greater potential for positive effect than Systems 1, 2 and 6.

Systems 2 (Existing/Committed), and 6 (Mixed Waste Processing) were ranked equally as the second lowest based on the uncertainties associated with the significance and magnitude of the different potential effects of the systems. System 2 had the second least positive effect on future generations. For System 6, there was the uncertainty of the benefit to future generations through the diversion of more material from landfills with the possibility of influencing behaviour away from the 3Rs. It was ranked lower than System 6 because of its limited distribution of 3Rs service. System 2 also had less potential for positive effect on future generations. System 6 had potentially the most significant negative facility distributional effect on some residents from the operation of the Mixed Waste Processing and composting facility while the majority of the regional residents were unaffected by the facility's operation.

System 1 was lowest ranked because it was likely to have the lowest positive distribution effects on future generations by not encouraging as significant a change in the lifestyle of the current generation toward greater personal involvement of residents in the management of their wastes. It also did not provide as great an improvement in the distribution of 3Rs service to residents as the other systems did, however, it has the least negative distribution effects due to facilities.

Social Environment Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and the criteria rankings (noting that all criteria are ranked equally), an overall system ranking could be completed for the Social Environment Criteria Group based on a qualitative evaluation. The evaluation considered trade-offs among the rankings for each system and criterion recognizing that there may be significant potential effects from the 3Rs systems and the potential effects for each criterion may occur throughout the life of the system and some may continue beyond the planning period. The overall rankings are provided at the top of Table 8.19.

System 4 (Expanded Blue Box) was highest ranked system overall. It was highest ranked for the criteria of Potential for Broad Social Impact and Distribution of Social Costs and Benefits and second highest for the Potential Local Community Impacts.

System 3 (Direct Cost) was ranked second highest overall based on its second highest ranking for all three criteria.

System 5 (Wet/Dry) was ranked third highest on the basis that it was the second highest ranked for the Distribution of Social Costs and Benefits and for Broad Social Impact criteria. It ranked as the second lowest for Potential Local Community Impact. The only significant difference between System 5 and 3 is that for Potential Community Impact, System 5 has the additional effects of a new MRF and odour and nuisance effects associated with "wet" waste.

System 2 was ranked second lowest on the basis that it was ranked equal to System 6 for Potential for Broad Social Impact and Distribution of Social Costs and Benefits, but that it was ranked much higher for Potential Local Community Impact.

Systems 1 and 6 were the lowest ranked systems. Due to some of the uncertainties involved in the analysis for each criterion, a judgement could not be made on which of the two systems was better than the other. System 1 ranked the lowest for the Broad Social Impact and Distribution of Social Costs and Benefits with this disadvantage being off-set by a highest ranking for Potential Local Community Impact. System 6 was ranked the lowest for Potential Local Community Impacts and second lowest for both Potential for Broad Social Impact and Distribution of Social Costs and Benefits.

On the basis of the Social Criteria Group, the York Region systems were ranked as follows (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 5 (Wet/Dry)
4 - System 2 (Existing/Committed)
5 - System 1 (Existing)
5 - Systems 6 (A+B) (Mixed Waste Processing)

8.3.4 Peel Region Systems Evaluation

8.3.4.1 Cost Criteria Group (Peel Region)

The Cost Criteria Group contains only one criterion, which is the cost per household (1992 dollars) for the waste management system (diversion and disposal). The cost per household for the waste management system (diversion and disposal) measures the overall cost of the waste management system. The indicator is based on the costs of the waste diversion system and the waste disposal system (in $/year) and dividing the sum of these costs by the total number of households in each Region. It provided a measure of how different diversion systems compare, when all waste management factors are taken into account. A number of diversion system cost indicators (e.g. cost/hh/year for the diversion system, costs/tonne diverted, etc.) were considered but were found to be of little value unless system costs were considered.

Cost Criteria Group - Overall System Ranking

Table 8.20 summarizes system cost per household data for the Region of Peel.

Systems 1 to 5 rank equally as highest ranked, with system costs (measured as costs/household/year) in the $133 to $139/household/year range, if disposal costs of $40/tonne were assumed, and $158 to $175/hh/year if disposal costs of $80/tonne were assumed. Within the accuracy level of this study, these costs are considered equal. System 6, mixed waste, was the lowest ranked, with an overall system costs of $239 to $245/household/year, if the mixed waste system produced a high quality compost, and $251 to 269/household/year if the compost quality was poor (i.e. greater quantities of material from the mixed waste plant were landfilled due to limited end use opportunities).

In summary, system ranking for the Cost Criteria Group is as follows:

Highest Ranked: Systems 1, 2, 3, 4 and 5
Lowest Ranked: Systems 6A and 6B

8.3.4.2 Municipal Finance Criteria Group (Peel Region)

The following describes Peel Region's system rankings for the Municipal Finance Criteria Group. The individual system rankings are presented first by criteria, and are followed by the overall criteria group rankings.

TABLE 8.20

PEEL REGION
NET EFFECTS SUMMARY FOR COST

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
COST							
Cost (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Lowest ranked	Lowest ranked
Cost per household (system)	Highest ranked due to: · $133-175/hh/yr	Highest ranked due to: · $133-172/hh/yr	Highest ranked due to: · $136-164/hh/yr	Highest ranked due to: · $136-165/hh/yr	Highest ranked due to: · $139-158/hh/yr	Lowest ranked due to: · $251-269/hh/yr	Lowest ranked due to: · $239-245/hh/yr

Potential for Impacts on Local Taxpayers

The following describes the system net effects on the local taxpayers taking into account both total additional tax levy and the household tax effect. As outlined in Table 8.21, household costs ranged between \$8 and \$47 for the various alternatives. System 1 (Existing), System 2 (Existing/Committed), System 3A (Direct Cost - revenue neutral) and System 4 (Expanded Blue Box) all represented tax increases of 1% and 3% in household taxes and are highest ranked. Systems 3B (Direct Cost - added revenue) and Systems 6 (A+B) (Mixed Waste Processing) represented increases of above 4% for household taxes and therefore were ranked lowest.

The second lowest ranked system was System 6B (Mixed Waste Processing - high quality compost) and the lowest ranked systems were System 3B (Direct Cost - added revenue) and System 6A (Mixed Waste Processing - low quality compost) both of which have the highest tax per household.

Potential for Impact of the Debt Burden of the Municipalities

The effects of the diversion commitment on the municipal capital programs was found to be more significant than the tax impact. This analysis assumed that the full capital cost of future diversion commitments would be annualized at 9% for a 10 year period.

On an overall basis, when all of the debt factors were taken together, System 1 (Existing) represented the highest ranked system as it carried no further capital costs. On the other hand, the mixed waste/high diversion system was the lowest ranked since it incurred the highest capital cost. All other systems were ranked second lowest since they carried high capital costs but affected Peel's financing to a lesser extent.

TABLE 8.21

PEEL REGION
NET EFFECTS SUMMARY FOR MUNICIPAL FINANCE

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3A Direct Cost (revenue neutral)[1]	System 3B Direct Cost (added revenue)[2]	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste (low quality compost)	System 6B Mixed Waste (high quality compost)
IMPACT								
Municipal Finance (Overall Ranking)	Highest ranked	Second highest ranked	Second highest ranked	Second highest ranked	Second highest ranked	Second highest ranked	Second lowest ranked	Lowest ranked
Impact on Local Taxpayers	Highest ranked due to:	Second highest ranked due to:	Third highest ranked due to:	Lowest ranked due to:	Highest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Tax levy ($)	· 3,568,000	· 16,723,800	· 18,589,200	· 28,589,200	· 18,817,000	· 17,943,800	· 29,128,300	· 24,299,400
· Tax per household ($)	· 8	· 28	· 31	· 46	· 31	· 30	· 47	· 40
· Increase in taxation (%)	· 1%	· 3%	· 3%	· 5%	· 3%	· 3%	· 5%	· 4%
Impact on Municipal Debt Burden	Highest ranked due to:	Second highest ranked due to:	Fourth highest ranked due to:	Second lowest ranked due to:	Third lowest ranked due to:	Third highest ranked due to:	Lowest ranked due to:	Second lowest ranked due to:
· Amount of debt ($)	· 0	· 90,300,000	· 90,300,000	· 90,300,000	· 900,300,000	· 90,300,000	· 91,000,000	· 105,000,000
· Debt payments ($)	· 0	· 14,100,000	· 14,100,000	· 14,100,000	· 14,100,000	· 14,100,000	· 14,200,000	· 16,400,000
· Debt capacity (%)	· 82%	· 66%	· 66%	· 66%	· 66%	· 66%	· 66%	· 64%
Impact on Municipal Reserves	Second highest ranked due to:	Second highest ranked due to:	Second highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Third highest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:
· Total reserves ($)	· 0	· 0	· 0	· 10,000,000	· 0	· -10,000,000	· -39,000,000	· -45,000,000
· Reserves/ household ($)	· 0	· 0	· 0	· 43	· 0	· -43	· -170	· -195
· Reserves/expenses (%)	· 0%	· 0%	· 0%	· 67%	· 0%	· -67%	· -360%	· -400%
Impact on Municipal Level of Service								
· Operating cost ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Expense/household ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
Impact on Private Sector Industries	Highest ranked due to	Lowest ranked due to:	Third highest ranked due to:	Highest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:	Lowest ranked due to:
· Private funding ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Costs ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Higher prices ($)	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect	· no effect
· Private taxes (%)	· 1%	· 5%	· 2%	· 2%	· 6%	· 5%	· 9%	· 7%

1 Under the Direct Cost (revenue neutral) system, no additional revenue would be charged for waste and diversion collection purposes from the homeowners beyond what .s now collected via municipal taxes

2 Under the Direct Cost (added revenue) system, garbage bag chargees would be levied in addition to normal property taxes that include waste diversion and disposal collection costs.

Potential Effect on Municipal Reserve Funds

The capital costs of System 5 (Wet/Dry) and both Mixed Waste Processing systems were so large that reserve fund financing was used to offset some of the expenditure. This totalled $10.0 million for the wet dry, $40.0 million for the mixed waste/low diversion system and $50.0 million for System 6B (Mixed Waste Processing - high quality compost). While debt levels for the other systems were large and potentially subject to reserve contributions, the effect on taxes remained relatively moderate without funding allocations. It was also shown under the system descriptions that the Direct Cost added revenue system had the capacity of generating a further $10.0 million in extra revenue that could have been placed into reserves and used for other waste management/waste diversion activities.

As a result of this, System 3B (Direct Cost - added revenue) was highest ranked since it added to the Region's reserve fund position. Conversely, the mixed waste/high diversion system was lowest ranked since it absorbed the highest amount of reserve funds. Similarly, the mixed waste/low diversion system was second lowest ranked and System 5 (Wet/Dry) was the third lowest ranked. The remaining systems: System 1 (Existing), System 2 (Existing/Committed), System 3A (Direct Cost - revenue neutral) and System 4 (Expanded Blue Box) were the second highest ranked because they did not have an impact on the reserve fund.

Potential for Impact on the Level of Municipal Services

As previously indicated, the annualized cost effect of the diversion systems had a low to medium impact on household taxation. Therefore there was no reason in the analysis to assume reductions in the delivery of service for other municipal departments to help fund diversion costs. Therefore, there was no impact on the functional service levels in the municipalities.

Potential for Impact on Private Sector Industries

Assuming the continuation of existing municipal funding mechanisms, the effects analysis did not consider that there would be direct impacts on the private sector to offset costs related to the diversion commitment. Residential diversion is assumed to be paid for by taxes and other public sector funds.

While taxes currently collected from the business sector now approach $125 million, tax charges for each system range from 1% for System 1 (Existing) to 9% for System 6A (Mixed Waste Processing [low quality compost]) systems.

System 1 (Existing) and System 3 (A+B) (Direct Cost) were the highest ranked. All other systems were ranked last.

Municipal Finance Criteria Group - Overall System Ranking

The system rankings by the criteria and indicators were based on the system net effects that are summarized above and contained in the Municipal Finance Technical Appendix. These net effects are summarized on Table 8.21. The criteria were all ranked the same level of order of importance as no one criteria was considered to carry more weight, or be more significant than others. By considering the relative magnitude of the effects for each of the criteria and indicators, an overall systems ranking could be completed for Municipal Finance Criteria Group. This is also summarized on Table 8.21.

The highest ranked system was System 1 (Existing). The Existing system represented the least cost to the tax payers in Peel Region and did not present any additional debt costs to the financial structure. System 2, 3 (A+B), 4 and 5 (Existing/Committed, Direct Cost, Expanded Blue Box, and Wet/Dry) were the second highest ranked systems. This was due to the fact that the systems all had similar merits.

System 6B (Mixed Waste Processing [high quality compost]) was the lowest ranked because it represented high tax effects and the highest capital cost, and therefore debt related system. Similarly, while less burdensome, System 6A (Mixed Waste Processing [low quality compost]) represented the second lowest ranked system for its impact on local tax payers.

To confirm this ranking, the Municipal Finance component also undertook a sensitivity analysis on the key variables that may affect the criteria indicators. This analysis is presented in the Municipal Finance Technical Appendix. The sensitivity analysis examined variations in capital costs (plus or minus 10% and 20%), rates of waste diversion (plus or minus 5%), variations in operating cost (plus or minus 5% and 10%) and finally, household growth including a no growth scenario. While changing the value of the indicators shown above, the sensitivity analysis shows that, given the ranges tested, the general ranking of the systems shown above would not significantly change.

The following summarizes the Peel Region system rankings with respect to the Municipal Finance criteria group (highest ranked to lowest ranked):

1 - System 1 (Existing)
2 - System 2 (Existing/Committed)
2 - System 3A (Direct Cost (Revenue Neutral))
2 - System 3B (Direct Cost (Added Revenue))
2 - System 4 (Expanded Blue Box)
2 - System 5 (Wet Dry)
7 - System 6A (Mixed Waste Processing - low quality compost)
8 - System 6B (Mixed Waste Processing - high quality compost)

8.3.4.3 Natural Environment Criteria Group (Peel Region)

The systems rankings by criterion were based on the "system net effects by criterion" and "advantages/disadvantages by criterion" documented in the individual system summary net effects tables for Peel Region contained in the Natural Environment Technical Appendix. The system rankings for the three natural environment criteria are discussed below. The system rankings, by criterion, are summarized in Table 8.22.

For the purpose of the system evaluation with respect to the natural environment, Systems 6A and 6B were considered to be the same. These system evaluations was combined and referred to as System 6.

Potential for Effects to Terrestrial Systems and Resources

Effects to terrestrial systems and resources were predicted to occur as a result of siting new 3Rs facilities and due to discharges of wastes or potentially harmful materials as a result of some accident or upset condition. The potential effects due to accidents was expected to be the same for all systems. As System 1 (Existing) had all of the necessary facilities in place, potential effects were expected only as a result of accidents.

TABLE 8.22

PEEL REGION
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A + B) Mixed Waste Processing
IMPACT						
Natural Environment (Overall Ranking)	Highest ranked	Second highest ranked with System 4	Third lowest ranked	Second highest ranked with System 2	Second lowest ranked	Lowest ranked
Potential for effects to terrestrial systems and resources	Highest ranked due to: · necessary facilities already existing · potential effects due to accidents	Second highest ranked due to: · potential effects due to siting new central compost facility and MRF · potential effects due to accidents	Second lowest ranked due to: · potential effects due to siting new central compost facility and MRF · potential effects due to accidents · higher likelihood of illegal dumping of wastes is anticipated and may result in effects	Second highest ranked due to: · potential effects due to siting new central compost facility and MRF · potential effects due to accidents	Lowest ranked due to: · potential effects due to siting of new MRF and new compost facilities · potential effects due to accidents	Lowest ranked due to: · potential effects due to siting new MRF, central compost facility and mixed waste processing and composting facility · potential effects due to accidents
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities	Second highest ranked due to: · potential effects due to siting new central compost facility and MRF · potential effects due to discharges from existing facilities and new compost facility	Third lowest ranked due to: · potential effects due to siting new central compost facility and MRF · potential effects due to discharges from existing facilities and new compost facility · higher likelihood of illegal dumping of wastes is anticipated and may result in effects	Second highest ranked due to: · potential effects due to siting new central compost facility and MRF · potential effects due to discharges from existing and new composting facilities	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting new MRF and compost facilities and discharges from new compost facilities	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting MRF, compost facility, and mixed waste processing/ composting facility and discharges from new compost and mixed waste facilities

PEEL REGION
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A + B) Mixed Waste Processing
Potential for effects to the atmospheric environment	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Highest ranked due to: · no processing and composting of mixed wastes or wet wastes · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases	Second lowest ranked due to: · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases · additional emissions from wet waste composting dependent on compost process	Lowest ranked due to: · emissions to atmosphere include: dust, exhaust, odours, bioaerosols and gases · additional emissions from mixed waste processing and composting

This system was considered highest ranked. Systems 2 and 4 (Existing/Committed and Expanded Blue Box, respectively) required additional facilities to those which already exist. These facilities are a new MRF and an in-vessel compost facility. It is expected that potential effects to terrestrial systems and resources can be effectively mitigated. This includes the siting of these new facilities in areas with compatible land uses (i.e. industrial zoned areas). These two systems were considered equal and second highest ranked. System 3 (Direct Cost) required the same new facilities as Systems 2 and 4. However, under the Direct Cost system there was a higher likelihood of illegal dumping of wastes occurring, making it lower ranked. The potential effects of illegal dumping were expected to be less than the effects associated with the siting of an additional facility in Systems 5 and 6. Systems 5 and 6 were considered equal and ranked lowest. The System 5 (Wet/Dry) required a new central compost facility in addition to the new MRF and compost facility identified for the other systems. System 6 required a new Mixed Waste Processing and compost facility, in addition to the new MRF and central compost facility required by the other systems. These systems were predicted to have the highest potential for the loss/removal or disruption of terrestrial systems and resources.

Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

Potential effects to aquatic systems were expected to occur for reasons similar to effects on terrestrial systems and resources (i.e. location of facility, discharges from the facility, accidents). However, additional effects to aquatic systems may occur due to discharges from 3Rs facilities. These discharges are expected to be in the form of leachate or contaminated surface water runoff from central compost facilities. The potential for effects due to discharges from existing 3Rs facilities was considered to be equal for all systems. Since the necessary facilities already exist for System 1 (Existing), this system was highest ranked. Systems 2 and 4 (Existing/Committed Expanded Blue Box) were ranked equal and second highest. These systems both require a new MRF and central compost facility. The potential effects from these facilities were expected to be minimal since the MRF will process only dry recyclables and the proposed compost facility is an in-vessel compost facility. Discharges from this type of compost facility are more readily controlled. System 3 (Direct Cost) requires these same two new facilities but it is anticipated that illegal dumping of wastes will occur as a result of this system. This dumping of wastes and its potential effects on aquatic systems make it ranked lower than Systems 2 and 4 (Existing/Committed, Expanded Blue Box). Systems 5 and 6 (Wet/Dry, Mixed Waste Processing) were considered equal and lowest ranked. Both systems require new 3Rs facilities in addition to those required for the other systems. These additional facilities are a compost and mixed waste facility, respectively. The potential effects on

aquatic systems and resources from these new facilities were expected to be greater than any other system.

Potential Effects to the Atmospheric Environment

All six alternatives were expected to have emissions to the atmosphere. These emissions included dust, odours, bioaerosols and gases generated at MRFs and compost facilities, with dust and exhaust emissions generated by waste collection vehicles. There was no differentiation between systems based on these emissions. Emissions to the atmosphere are reduced by such measures as following proper operating procedures of the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. The potential for effects to the atmospheric environment from emissions was expected to be greater if wet waste (household organic) or mixed waste was being processed and/or composted at centralized facilities in large volumes. Systems 1 to 4 did not include the management of wet waste or mixed waste. These four systems were considered equal and highest ranked. System 5 included the composting of wet waste while System 6 included Mixed Waste Processing and composting. Due to the different nature of the two processes, with the wet waste composting to be done using in-vessel technology and Mixed Waste Processing and composting typically being open to the atmosphere (i.e. windrow technology), the potential effects of System 6 were considered to be the greatest and the system was considered lowest ranked.

Natural Environment Criteria Group - Overall System Ranking

By considering the ranking of systems by criterion and the criteria rankings together, an overall system ranking could be completed for the Natural Environment Criteria Group. System 1 (Existing) was highest ranked for each of the three criteria. As a result, this system was highest ranked overall for the Natural Environment Criteria Group. Systems 2 and 4 (Existing/Committee, Expanded Blue Box) were ranked equal and second highest. These systems were ranked lower than System 1 (Existing) due to potential effects to terrestrial systems and resources, and aquatic systems and water resources from siting a new MRF and central compost facility. System 3 (Direct Cost), although requiring the same new facilities, was considered lower ranked than Systems 2 and 4 (Existing/Committed, Expanded Blue Box), and was ranked third lowest overall. The potential effects on terrestrial systems and aquatic systems from illegal dumping of wastes resulted in the lower ranking.

The System 5 (Wet/Dry) and System 6 (Mixed Waste Processing) systems were the second lowest and lowest ranked systems for all three criteria. System 6 (Mixed Waste Processing) was ranked as the lowest system overall. Potential effects to the atmospheric environment from System 6 (Mixed Waste Processing) were considered to be greater than for System 5 (Wet/Dry). The potential effects for the other criteria were considered equal for these two systems.

The overall system ranking for the Natural Environment Criteria Group is as follows (highest ranked to lowest ranked):

1 - System 1 (Existing)
2 - System 2 (Existing/Committed)
2 - System 4 (Expanded Blue Box)
3 - System 3 (Direct Cost)
4 - System 5 (Wet/Dry)
5 - System 6 (Mixed Waste Processing)

8.3.4.4 Service Criteria Group (Peel Region)

The following discusses Peel Region system rankings for the Service Criteria Group. System rankings are first discussed by criteria then for the overall criteria group. Table 8.23 summarizes the system rankings on the basis of service.

Reliability

The reliability of each system was judged according to whether the technologies which form the system had been proven reliable and had operated successfully in at least one jurisdiction in the world at full scale for a period of at least one year. The issue of whether the system is dependent on the success of a single approach was also considered. Single approach systems are more susceptible to collapse in the event of failure of any of the parts.

Since the technology had been proven (specifically for the Region of Peel) and the systems were diverse, Systems 1 (Existing) and 2 (Existing and Existing/Committed) were judged to be equal and highest ranked.

PEEL REGION
NET EFFECTS SUMMARY FOR SERVICE

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
SERVICE							
Service (Overall Ranking)	Second lowest ranked	Third highest ranked	Second highest ranked	Highest ranked	Third highest ranked	Lowest ranked	Lowest ranked
Reliability	Highest ranked due to: · technologies presently exist and are proven · success not due to reliance on single approach	Highest ranked due to: · technologies presently exist and are proven · success not due to reliance on a single approach	Second highest ranked due to: · technologies presently exist and are proven · success not due to reliance on a single approach · success partially dependent on participation in additional source separation by residents	Second highest ranked due to: · technologies presently exist and are proven · success not due to reliance on a single approach · Peel residents presently participating in successful partially expanded program · markets unstable	Second lowest ranked due to: · technology proven in Europe but not yet in North America at full scale · limited ability to include multi-family · depends on one primary approach · relies on significantly increased public participation	Lowest ranked due to: · unproven technology that is not fully successful anywhere in North America at present · applies single approach to third bag of waste · if successful, is likely compatible with existing incineration	Lowest ranked due to: · unproven technology that is not fully successful anywhere in North America at present · applies single approach to third bag of waste

TABLE 8.23

PEEL REGION
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Flexibility	Lowest ranked due to: · flexibility limited at present by range of dry materials accepted, and inability to divert organics	Second lowest ranked due to: · new MRF provides increased processing capacity · new recycling centre provides more opportunity to divert/reuse range of materials · increase in materials collected expected due to addition of multi-family recycling · partially expanded range of materials will be maintained · proposed composting facility provides processing capacity for organics	Mid range ranking due to: · basic compatibility with existing system · additional quantities of materials generated will be processed in new MRF · increased range of dry materials can be accommodated · collection of wet wastes not provided	Second highest ranked due to: · compatibility with existing system (i.e. partially expanded blue box) · can phase project in gradually · increases waste diversion · uses basis of System 2 (Existing/Committed)	Highest ranked due to: · collection of wider range and greater quantity of materials: (including wet waste and others not captured in residential blue box programs · proposed MRF and composting facility in existing/committed provide capacity to process secondary materials · compatible with System 2 (Existing/ Committed)	Highest ranked due to: · provides ability to divert both wet and dry wastes · increased waste diversion · not compatible with System 2 (Existing/ Committed) · compatible with existing collection system	Highest ranked due to: · provides ability to divert both wet and dry wastes · increased waste diversion · not compatible with System 2 (Existing/ Committed) · compatible with existing collection system
Performance	Lowest ranked due to: · limited waste diversion of 20-25%	Second lowest ranked due to: · limited waste diversion of 23-30%	Third highest ranked due to: · estimated waste diversion of 40-52%	Third highest ranked due to: · estimated waste diversion of 38-53%	Second highest ranked due to: · estimated waste diversion of 56-70%	Second highest ranked due to: · estimated waste diversion 56-63%	Highest ranked due to: · waste diversion of 75-82%

PEEL REGION
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability	Second lowest ranked due to: · maintain or small positive increase in 3Rs behaviour · no changes to the system; residents are familiar with it · costs acceptable to residents and municipalities if current subsidies continue · not likely to encourage greater individual action	Second highest ranked due to: · positive increase in 3Rs behaviour · minor changes to the systems; residents are familiar with it · costs acceptable to residents and municipalities if current subsidies continue · suitable for high density housing · likely to encourage greater individual action	Second highest ranked due to: · potential to encourage greater participation by individual 3Rs by source separating more materials and with more households provided with composters than Systems 1, 2 and probably 6 · costs acceptable to residents and municipalities if current subsidies continue. Potential revenue gain for System 3 to off-set other waste management costs · potential for controversy for some municipalities in the short-term · potential for controversy reduced if education and consultation program implemented and appropriate user pay options selected	Highest ranked due to: · residents and municipalities are familiar with the system · costs are acceptable if current level of subsidies continue, if not, costs may not be acceptable and service may be reduced, reducing the effectiveness of the system	Third highest ranked due to: · at the higher costs, residents and municipalities may be unwilling/unable to pay for the system · application to and acceptance in apartments and rural areas uncertain · acceptability of the system may be affected by odour, health and vermin effects from food waste composting facilities and from food waste collection and storage in apartment buildings · residents may not separate high proportion of food waste, particularly in winter · potential for less contamination of recyclables than System 6	Lowest ranked due to: · potential for processing and composting facility to be unacceptable · residents and municipalities may be unwilling/unable to pay the high capital costs · potential for higher contamination of recyclables than the other systems · system does not encourage source separation; could reduce participation in blue box and household composting	Lowest ranked due to: · potential for processing and composting facility to be unacceptable · residents and municipalities may be unwilling/unable to pay the high capital costs · potential for higher contamination of recyclables than the other systems · system does not encourage source separation; could reduce participation in blue box and household composting

TABLE 8.23

PEEL REGION
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6A Mixed Waste Processing (low quality compost)	System 6B Mixed Waste Processing (high quality compost)
Social Acceptability			· difficult to implement user pay and composting in high density housing and unlikely to significantly increase participation in high-rises (represent about 25% of the households) · potential for more illegal dumping than other systems		· suitable for the low density areas of Peel · at higher costs residents and municipalities may be unwilling/unable to pay for the system		

Systems 3 and 4 (Direct Cost and Expanded Blue Box) were judged equal, and second highest ranked. System 3 (Direct Cost) is based on an approach that is proven in North America and it is based, to a degree, on reliance on a single approach. System 4 (Expanded Blue Box) is also based on proven technology, has proven successful in Centre and South Hastings in Ontario and relies extensively on public participation for its success. Also, Peel residents are presently participating in a partially expanded program which has been successful.

System 5 (Wet/Dry) is ranked second lowest as it relies on extensive public participation and while technology is proven, it has not been proven on a full scale anywhere in Ontario or North America, and may be limited in its ability to include multi-family buildings. Extensive research has been carried out on wet-dry systems in the Region of Peel through a series of pilot projects carried out on an on-going basis for the last two years.

Systems 6 (A+B) (Mixed Waste Processing with high and low quality finished compost) were ranked equally and lowest because they are based on a technology that is somewhat unproven to have operated successfully at full scale for a period of one year, without plant shutdowns and operational problems. Mixed Waste Processing has not been used successfully anywhere in North America. This approach is also being abandoned in Europe at this time, having been used in European jurisdictions for 40 years.

Systems 6 (A+B) rely on a single approach for the third bag of waste. A mixed waste system had been proposed for Peel by St. Lawrence Cement but the project was cancelled in September 1992.

Flexibility

System flexibility was judged according to the types and quantities of waste accommodated and compatibility with the Existing system. This criterion incorporated the ability of the system to adapt to changing waste characteristics and quantities.

Systems 6 (A+B) (Mixed Waste Processing with high and low finished compost quality) were judged to be highest ranked because they could handle the full range and quantity of residential materials generated in Region of Peel. Although there is some question about the ultimate fate of secondary materials from Mixed Waste Processing plants, both systems were judged to be compatible with the existing collection system and lead to significantly increased waste diversion.

System 5 (Wet/Dry) was also judged to be highest ranked as it collects a wide range and greater quantity of materials that are not regularly collected in Blue Box programs. The proposed MRF and composting facility in the Existing/Committed system provide the capacity to process both the organics and the expanded list of dry materials recovered by this system. This system has greater flexibility than Systems 1 to 4, as it can divert a significant quantity of wet wastes.

System 4 (Expanded Blue Box) was judged as second highest ranked. While it collects a wider range and quantity of dry materials and is compatible with the System 2 (Existing/ Committed system), the overall projected quantities of materials collected are lower than in some systems. It also does not have the flexibility to divert significant quantities of wet materials.

System 3 (Direct Cost) was ranked third highest. It was compatible with the Existing system and the new MRF can process the additional quantities of materials that the system would generate.

System 2 (Existing/Committed) was ranked second lowest because, while compatible with the Existing system, it would handle only a slightly increased range of materials.

System 1 (Existing) was ranked lowest because it was limited in the range and quantities of materials it diverts.

Performance

System performance was judged according to the amount of material diverted by each system, expressed as a percentage of the waste generated. For diversion estimates it was assumed that markets would exist for all recovered materials, although this is not necessarily the case at this time. Markets are discussed in Section 5.9, along with the limitations and problems for some materials. System 6B (Mixed Waste Processing - low quality compost) was highest ranked because it significantly increases the amount of material diverted, despite that the potential lower quality of secondary materials may reduce their marketability. By assuming that markets/end uses can be found for all of the finished compost, an overall diversion rate of up to 82% was estimated.

System 6A (Mixed Waste Processing - low quality finished compost) was ranked as second highest, along with System 5 (Wet/Dry). Both systems have the potential to divert 58 to 70% of the residential waste stream.

Systems 3 (Direct Cost) and System 4 (Expanded Blue Box) were ranked equally as third highest, with diversion potential in the 40 to 53% range. The range reflects some uncertainty in the level of source reduction achievable by the year 2000. This has been estimated at 5% based on 1992 base case rates, for the purpose of this study. The level of participation in backyard composting is also somewhat uncertain. The higher diversion estimate assumes that 80% of single family households would divert up to 240 kg/hh/year, the lower rate assumes that some households would average a reduced rate of 100 kg/hh/year through backyard composting.

Systems 1 (Existing) and System 2 (Existing/Committed) are ranked as lowest and second lowest respectively, due to the lower level of material diverted. These systems are estimated to divert 20 to 25% (Existing) and 23 to 30% (Existing Committed) of the residential waste stream, which is below the provincial diversion target of 50%.

Social Acceptability

The social acceptability of each system was evaluated on the basis of the potential effects of the systems on participation, attitudes and perception of 3Rs activities and willingness to pay for the system. Based on these indicators, System 4 (Expanded Blue Box) was identified as the highest ranked system because residents and municipalities were familiar with the system components and could be expected to respond more quickly and more positively to the system. System 4 is also suitable for the low density areas of Peel. In addition, all apartment buildings of more than 6 units would be provided with recycling service under the new 3Rs regulations, providing an improved level of service to these residents, and likely encouraging greater participation. In addition, costs are acceptable, assuming current levels of subsidy continue.

Systems 2 (Existing/Committed) and 3 (Direct Cost) were ranked as second highest because they both have the potential to encourage greater participation in 3Rs than System 1 (Existing), have acceptable costs and both are suitable for low density urban areas of Peel. Although System 3 may be difficult to implement in high density areas and may be controversial in some municipalities, it does have the advantage over System 2 of potentially encouraging greater participation by individuals and greater behavioral change to support 3Rs. Both systems were ranked higher than Systems 1, 5 and 6 (Existing, Wet/Dry, Mixed Waste Processing) because they have greater potential to encourage stronger positive attitudes and behaviour toward the 3Rs.

System 5 (Wet/Dry) was the third highest ranked because, although the costs are of the same order of magnitude as for Systems 2, 3 and 4 (Existing/Committed, Direct Cost,

Expanded Blue Box), it is unlikely to increase participation by individuals in 3Rs activities as much as Systems 2, 3, and 4. The acceptability of the system could be reduced due to potential odour and vermin effects from the volumes of food waste being composted at the composting facility. There is also increased potential for some groups to participate less due to greater difficulty in using the 90 gallon bins (e.g. elderly and disabled) and for others not to separate food waste (due to the messiness and inconveniences associated with the bins). The application and acceptance of either bins or bags for the Wet/Dry system in apartments is uncertain.

System 1 (Existing) was the second lowest ranked because although it would maintain the current 3Rs behaviour, and people are familiar with the system, it was unlikely to encourage greater individual or municipal behaviour to reduce, reuse or recycle their waste. In addition, although this system had a cost acceptability advantage over System 6 (Mixed Waste Processing), the cost for Systems 2, 3, 4 and 5 appeared to be equally acceptable.

System 6 (Mixed Waste Processing) was lowest ranked because the mixed waste processing and composting facility operation was unlikely to continue to operate due to odour problems; it did not encourage source separation and could reduce individual participation in some of the components of the system (e.g. Blue Box). The costs for the mixed waste processing and composting facility would likely be unacceptable to residents and municipalities. No distinction was made between Systems 6A and 6B.

Service Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and criteria rankings, an overall system ranking could be completed for the Service Criteria Group. Any system that received a mix of a lowest and highest rankings for reliability and performance (the two top ranked criteria) were ruled out of contention as highest ranked systems. The ultimate ranking of these systems were then evaluated using social acceptability and flexibility.

Systems 6 (A+B) (Mixed Waste Processing) received a highest ranking for performance, but a lowest ranking for reliability, and were therefore eliminated from consideration as the highest ranked system. The same was true (in reverse) for the Existing system.

System 4 (Expanded Blue Box) was highest ranked in terms of social acceptability, second highest ranked in terms of reliability, and third highest ranked (second lowest ranked) in terms of performance, and was therefore the highest ranked system overall. System 3 (Direct Cost) was considered second highest ranked. It received a similar

ranking to System 4 for reliability and performance, but was considered less socially acceptable. It also received a lower ranking than System 4 for flexibility (as it handles a narrower range of materials).

System 5 (Wet/Dry) and System 2 (Existing/Committed) were ranked third highest. System 5 received a higher ranking than Systems 3 and 4 (Direct Cost, Expanded Blue Box) for performance (due to its higher diversion potential) but a lower ranking on reliability. This combination resulted in the system being evaluated on other criteria. System 2 (Existing/Committed) received a low ranking on performance, but a high ranking on reliability, and was therefore similar to System 5 (Wet/Dry). System 2 received a high rank for social acceptability. System 5 (Wet/Dry) was less socially acceptable than System 2, but had greater flexibility. Flexibility was considered the least important criterion in the service grouping, but the combination of factors resulted in Systems 5 and 2 being ranked equally in the service grouping.

Mixed Waste Processing Systems 6 (A+B) (Mixed Waste Processing) were lowest ranked overall. While they received a rank of second and highest on performance (for 6A and 6B respectively), they were each considered lowest ranked on reliability (a top criterion) and social acceptability. Both were considered highest ranked flexibility, but this was the criterion considered of least importance.

System 1 (Existing) was ranked lowest for performance and highest for reliability. It was therefore considered equal to Systems 6A and 6B for a highest and lowest score combination for these two criteria. It was considered more socially acceptable and less flexible than Systems 6A and 6B. Because social acceptability was considered a more important criterion, System 1 was ranked as second lowest.

In summary, the system ranking under the Service Criteria Grouping for Peel Region was (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 5 (Wet/Dry) and System 2 (Existing/Committed)
4 - System 1 (Existing)
5 - Systems 6 (A+B) (Mixed Waste Processing)

8.3.4.5 Social Environment Criteria Group (Peel Region)

The system rankings by criterion were based on the "system net effects by criteria" and "advantages/disadvantages by criteria" contained in the individual system summary net effects tables contained in the Social Environment Technical Appendix. The system net effects were determined based on the successful application of mitigation/enhancement measures to the potential effect. The key "advantages/disadvantages" were listed for each criterion for each system in comparison to the other systems.

Net effects common to all systems were not carried forward to the evaluation of the system options because they did not assist in distinguishing among systems. Although the systems are named for the dominant element of the system (e.g., Expanded Blue Box) the evaluation was based on the entire system and all of its components as described in Section 6.6. The system rankings for the three Social Environment Criteria are discussed below and summarized in Table 8.24. The overall system rankings can be found in the top row of Table 8.24.

Potential Local Community Impacts

Potential local community impacts could be anticipated as a result of siting new 3Rs facilities due to expansion and increased use of existing facilities and non-optimal operating conditions. The potential effects of expanded use of existing facilities were expected to be the same for Systems 1, 2, 3 and 4 (Existing, Existing/Committed, Direct Cost, Expanded Blue Box). System 1 (Existing) has all of the necessary facilities in place while the other systems required expansion of or new facilities. As a result, System 1 (Existing) was considered the highest ranked system.

Systems 2 (Existing/Committed), 3 (Direct Cost) and 4 (Expanded Blue Box) were ranked as the second highest systems because they all required the same new facilities (Peel Region has planned for most of the facilities required for these systems.) Therefore, similar potential effects are expected. Although there was the potential for social effects from illegal dumping to occur with System 3, the significance of the effects is uncertain. With both Systems 3 and 4 there was likely to be an increased flow of materials, with the potential for additional nuisance effects. Due to the uncertainties of the additional volumes and the potential effects, the systems were ranked equal to System 2.

PEEL REGION
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
IMPACT						
Social Environment (Overall Ranking)	Second lowest ranked	Third highest ranked	Second highest ranked	Highest ranked	Third highest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · no new facilities required · potential effects due to increased use of existing facilities	Second highest ranked due to: · Systems 2, 3, 4 and 5 have the same facilities; potential displacement and disruption effects due to expanded use of existing facilities and one new centralized composting facility, one new MRF, community recycling centres and mini-recycling depots and drop-off facilities. · potential effects are likely less important than Systems 5 and 6	Second highest ranked due to: · Systems 2, 3, 4 and 5 have the same facilities; potential displacement and disruption effects due to expanded use of existing facilities and one new centralized composting facility, one new MRF, community recycling centres and mini-recycling depots and drop-off facilities. · potential effects are likely less important than Systems 5 and 6 · potential for effects from illegal dumping/burning	Second highest ranked due to: · Systems 2, 3, 4 and 5 have the same facilities; potential displacement and disruption effects due to expanded use of existing facilities and one new centralized composting facility, one new MRF, community recycling centres and mini-recycling depots and drop-off facilities. · potential effects are likely less important than Systems 5 and 6	Second lowest ranked due to: · Systems 2, 3, 4 and 5 have the same facilities however System 5 adds a leaf and yard waste composting facility; potential displacement effects are due to expanded use of existing facilities and the one new centralized composting facility, one new MRF, community recycling centres and mini-recycling depots and drop-off facilities. · potential displacement and disruption effects will likely be more important than Systems 2, 3 and 4 but less than System 6. · potential health concerns associated with centralized composting for wet stream	Lowest ranked due to: · greatest potential for displacement and disruption of residents, community features and disruption of community due to new mixed waste processing and composting facility · potential for health concerns associated with processing and composting facility

TABLE 8.24

PEEL REGION
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Potential for Broad Social Impact	Lowest ranked due to: · unlikely to maximize potential for lifestyle change · limited potential for additional employment and economic development in the short or long-term · most convenient system for residents (with System 2)	Highest ranked due to: · potential to increase but not maximize the potential for lifestyle change · potential for some additional employment and economic development in the short and long-term · most convenient system for residents (with System 1)	Second highest ranked due to: · potential to foster greater awareness of benefit of 3Rs and should encourage change to more sustainable lifestyle · potential for some additional employment and economic development in the short and long-term. · potential increase in illegal disposal and incineration by households · potentially less convenient than Systems 1 or 2.	Highest ranked due to: · potential for residents to participate more effectively in source separation than other systems due to familiarity · likely to increase but not maximize the potential for lifestyle change · potential for additional employment and economic development in the short and long-term · potential for greater inconvenience than System 1, 2, 3 (considered low effect)	Third highest ranked due to: · potential for increased economic development with more reliable supply of materials for recycling industries with less contamination than mixed waste · uncertain if the system will maximize positive lifestyle change (could reduce the participation in source separation) · potential for greater inconveniences than Systems 1 - 4. · difficult to implement in high density households.	Lowest ranked due to: · potential for increased economic development with more reliable supply of materials for recycling industries · however potential for greater contamination of the recyclable and compost streams than the other systems · unlikely to maximize positive lifestyle change · may reduce the amount of household source separation · potential for greater inconvenience than System 1, 2 and 3, if residents participate fully

PEEL REGION
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Direct Cost	System 4 Expanded Blue Box	System 5 Wet/Dry	System 6 (A+B) Mixed Waste Processing
Distribution of Social Costs and Benefits	Lowest ranked due to: · likely least positive effect on future generations due to least potential to influence 3Rs behaviour · least positive effect on distribution between household types because some households are not provided with the same 3Rs opportunities · least negative distribution effects due to facilities as no new facilities are required.	Second lowest ranked due to: · potentially second least positive effect on future generations · more equitable distribution of 3Rs services between housing types than Systems 1 and 2 but less than Systems 3-6. · second least negative distribution effects due to facilities	Second highest ranked due to: · potential increased financial burden for large households · potential for positive benefit to future generations uncertain (depends on amount and effects of illegal dumping) · second least negative distribution effects due to facilities	Highest ranked due to : · improved distribution effects by providing 3Rs service to more people than Systems 1, 2 and 3 · positive distributional effects for current and next generation with continuing growth in changes to 3Rs lifestyle/ behaviour · second least negative distribution effects due to facilities	Second highest ranked due to: · more significant negative distribution effects due to facilities than Systems 1 - 4 · potential for significant benefit to future generations from higher volumes of waste diverted, but may have a negative effective on future 3Rs behaviour · improved distribution effects by providing 3Rs service to more people than Systems 1, 2 and 3	Third lowest ranked due to: · improved distribution effects by providing 3Rs service to more people than Systems 1, 2 and 3 · potentially most significant negative distribution effects due to facilities · potential for benefit to future generation from highest volumes of waste diverted but may have negative effect on future 3Rs behaviour from reduced participation in source separation

The difference in potential effect of Systems 2, 3, and 4 compared to System 5 (Wet/Dry) is likely to be small. System 5 (Wet/Dry) was ranked second lowest because of the potential for greater odour effects associated with the composting facility and the increased volume of food wastes expected to be collected and composted. This may result in additional effects on residents and special/sensitive groups due to additional odour effects, health concerns and traffic related effects.

System 6 (Mixed Waste Processing) was lowest ranked because the impacts on residents, special/sensitive groups, community features and businesses and the community associated with a Mixed Waste Processing and composting facility were expected to be more significant than the effects of the MRF and composting facilities of Systems 2, 3, 4, and 5 (Existing/Committed, Direct Cost, Expanded Blue Box, Wet/Dry). Most of these types of facilities in North America have been closed due to odour problems (RIS, 1993).

Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social impacts on Peel Region's broad social environment in terms of lifestyle and the employment and economic development opportunities in the Region over the planning period.

System 4 (Expanded Blue Box) was found to be the highest ranked because it provided the potential for residents to continue to change their lifestyle in a way that is familiar to them while encouraging separation of a greater number of materials, more frequently and with less error than the other systems. Systems 3, 5, and 6 (Direct Cost, Wet/Dry, Mixed Waste Processing) had a greater potential for faulty source separation, both deliberate and inadvertent. Systems 1 and 2 (Existing, Existing/Committed) did not provide as much source separation opportunity to as great a number of people. System 4 also had greater potential for additional employment and economic development than Systems 1, 2, and 3 due to a more reliable supply of materials for recycling and "green" industries.

Systems 2 (Existing/Committed) and 3 (Direct Cost) were ranked the second highest systems because they too should encourage additional change to a lifestyle that incorporates higher levels of personal involvement by residents in the management of their wastes and increases the opportunities for employment and economic development. However, in System 3 (Direct Cost) there is a greater potential for some residents to engage in illegal dumping and incineration to reduce the amount of waste for which they have to pay collection costs. This disadvantage is off-set by the potential to provide greater incentive to practice 3Rs than System 2 (Existing/Committed).

System 5 (Wet/Dry) was ranked third highest because it had potential to increase employment and economic development by providing a more reliable supply of material

to recycling and green industries with less contamination than System 6 (Mixed Waste Processing). However, it was uncertain whether the system would achieve a change in lifestyle in the Region that incorporates personal involvement in the management of waste. The opportunity still exists for residents not to separate their recyclables and compostables, but instead to put them into the garbage stream. In addition, it was uncertain whether the system can be implemented effectively in apartment buildings. System 5 (Wet/Dry) introduced a number of lifestyle inconveniences associated with the 90 gallon bins and the required sorting and storage of food waste. It was also likely to have greater potential effects on special/sensitive groups (e.g., elderly and disabled) due to the requirement to use 90 gallon bins for their waste and separated materials. The significance of these inconveniences was uncertain.

Systems 1 and 6 (Existing, Mixed Waste Processing) were lowest ranked because the net change for these systems is considered less positive than Systems 2, 3, 4, and 5. System 1 (Existing) has potential for a small positive increase in employment and economic development opportunities, and limited support of a change in lifestyle to more personal involvement of residents in managing their wastes. System 6 (Mixed Waste Processing) has greater potential for employment and economic development through the supply of greater volumes of material for industries than all of the other systems but it may reduce the participation of residents in source separation and may not support further development of the 3Rs.

Distribution of Social Costs and Benefits

Potential distributional effects were predicted to occur as a result of lifestyle changes on some groups in the Region and on future generations. System 4 (Expanded Blue Box) was determined to be the highest ranked due to its overall positive current and future generation effects. It provided 3Rs service to more people than Systems 1 and 2 (Existing, Existing/Committed) and provides more equitable distribution of 3Rs services among housing types by providing composting and recycling opportunities to multi-family households. It continued the growth in changes to 3Rs lifestyle/behaviour that should have greater benefit to future generations than Systems 1, 2, and 3 (Existing, Existing/Committed, Direct Cost) and has fewer negative distribution effects than Systems 5, and 6 (Wet/Dry, Mixed Waste Processing) in the short-term due to fewer facilities being required.

Systems 3 (Direct Cost) was ranked as the second highest. It improved the distribution of 3Rs service over Systems 1 and 2 (Existing, Existing/Committed) by providing the opportunity to participate in 3Rs activities to a higher proportion of households, but it provided a lower distribution of service than System 5. System 3 has potential for an increased financial burden for large households.

Systems 2 (Existing/Committed), 5 (Wet/Dry) and 6 (Mixed Waste Processing) were ranked equally as the second lowest based on the uncertainties associated with the significance and magnitude of the different potential effects of the systems. System 2 (Existing/Committed) had the second least positive effect on future generations with some additional support over System 1 (Existing) for changes in lifestyle to encourage greater personal involvement by residents in the management of their waste. It had a small improvement through the provision of 3Rs service to a greater proportion of households than System 1 but had a small increase in negative distribution of effects due to facilities in comparison to System 1.

System 5 (Wet/Dry) had a greater potential for negative distributional effects of new facilities than Systems 1, 2, 3 and 4 (Existing, Existing/Committed, Direct Cost, Expanded Blue Box). For all three systems the magnitude of effect on future generations was uncertain.

System 6 (Mixed Waste Processing) had potentially the most significant negative distributional effects on some residents from the operation of the Mixed Waste Processing and composting facility while the majority of the Regional residents are unaffected by the facility's operation. In addition, there was the uncertainty of the benefit to future generations through the diversion of more material from landfills with the possibility of influencing behaviour away from the 3Rs. However, it improved the distribution of services over System 1 and 2 (Existing, Existing/Committed).

System 1 (Existing) was lowest ranked because it was likely to have the lowest positive distribution effects on future generations by not encouraging as much change in the lifestyle of the current generation toward greater personal involvement of residents in the management of their wastes. It also did not provide as great an improvement in the distribution of 3Rs service to residents as the other systems do but it had the least negative distribution effects due to facilities.

Social Environment Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and the criteria rankings (noting that all criteria are ranked equally), an overall system ranking could be completed for the Social Environment Criteria Group based on a qualitative evaluation. The evaluation considered trade-offs among the rankings for each system and criterion recognizing that there may be significant potential effects from the 3Rs systems and the potential effects for each criterion may occur throughout the life of the system and some may continue beyond the planning period. The overall rankings are provided at the top of Table 8.24.

System 4 (Expanded Blue Box) was the highest ranked system overall. It was highest ranked for the criteria of potential for broad social impact and distribution of social costs and benefits and second highest for the potential local community impacts.

System 3 (Direct Cost) was ranked second highest overall based on its second highest ranking for all three criteria.

Systems 2 (Existing/Committed) and 5 (Wet/Dry) were ranked third highest on the basis that System 5 was second highest ranked for the distribution of social costs and benefits and third highest ranked system for broad social impact criteria. It ranked as the second lowest for potential local community impact. These rankings, overall, provided input to a ranking of System 5 higher than Systems 1 and 6 (Existing, Mixed Waste Processing). Although System 2 was ranked higher than System 5 for the potential local community impact, System 5 was ranked higher with respect to potential for broad social impact and distribution of social costs and benefits. However, due to some of the uncertainties involved in the analysis for each criterion, a judgement could not be made on which of the two systems was better than the other.

System 1 (Existing) was ranked as the second lowest primarily because it ranked as the lowest for the broad social impact and distribution of social costs and benefits. This disadvantage was off-set by a highest ranking for potential local community impact.

System 6 (Mixed Waste Processing) was ranked lowest because it was ranked as lowest for the local community impact, second lowest for broad social impact and third lowest for distribution of social costs and benefits. In comparison to the other systems, System 6 was more consistently ranked lower than the other systems.

A list of the overall system ranking for the Social Environment Criteria Group for Peel Region is as follows (highest ranked to lowest ranked):

1 - System 4 (Expanded Blue Box)
2 - System 3 (Direct Cost)
3 - System 2 (Existing/Committed)
3 - System 5 (Wet/Dry)
4 - System 1 (Existing)
5 - System 6 (Mixed Waste Processing)

8.4 GTA IC&I Systems Evaluation

The following discusses the IC&I 3Rs systems evaluation. As previously outlined in Chapter 7.0, the six IC&I 3Rs systems which were developed include:

System 1 (Existing)
System 2 (Existing/Committed)
System 3 (Extended 3Rs Regulations)
System 4 (Expanded 3Rs Regulations)
System 5 (Expanded 3Rs Regulations with Organics)
System 6 (Processing All IC&I Waste)

8.4.1 Cost Criteria Group (IC&I)

The Cost Criteria Group contained two criteria. These were:

- Diversion system Cost (expressed as cost per tonne diverted); and
- Total System Cost (diversion plus disposal).

The above two criteria were chosen as valuable indicators of the comparative costs of different waste diversion systems with different costs and performances. A third criterion, diversion system costs (expressed $/year), was considered to have limited meaning for the IC&I sector. It was decided that the information was adequately captured using the diversion cost/tonne as an indicator.

Total costs of the waste diversion system (expressed as cost per tonne diverted) are often of limited use in determining comparative efficiencies, therefore an indicator which took into account the performance of the system was of more value. The cost per tonne diverted measured the efficiency of the waste diversion system, and was used to compare different approaches to waste management. Differences indicated the relative costs of diverting different materials.

Total System Cost measured the combined cost of disposal and diversion systems. Isolated, the separate costs of diversion and disposal would have had little value as indicators, since a system which has a low diversion cost, due in part to a low diversion rate, would incur a correspondingly high disposal cost.

Total Waste Management System Cost

The total system costs of Systems 1 to 6 vary from \$354 to \$419 million per year. Within the accuracy of these calculations (considered to be ±25%), the costs of Systems 1 to 6 are considered to be the same. Thus, Systems 1 through 6 are all highest ranked. The insignificant change in cost is due to the relatively small difference between the cost of recovering materials and the cost of disposal.

It should be stressed that costs for all systems were developed using "ball park" costs and prices for recycling and disposing of different materials obtained through discussion with GTA recyclers, and general IC&I waste collection and disposal rates obtained through discussions with haulers. These were considered less reliable than the cost data used for the residential systems, which were obtained from municipal budget data, and are likely to change as economic factors change. As an example, the tipping fee for IC&I waste dropped from \$150/tonne, to \$80-90/tonne during the course of this study, which had a significant impact on estimated costs. For this reason, these costs should be considered relative and of value only for comparative purposes.

Cost Per Tonne Diverted

For the indicator cost per tonne diverted, there was very little difference between Systems 1, 2, 3, 4, and 5 (Existing; Existing/Committed, Extended 3Rs Regulations, Expanded 3Rs Regulations, Expanded 3Rs Regulations with Organics). The costs per tonne diverted for these five systems range from \$110/tonne to \$117/tonne. Within the accuracy of these calculations, these are considered the same. All of these systems were therefore highest ranked. System 6 (Processing All IC&I Waste) had the highest cost per tonne diverted of all six systems, at \$185/tonne, and was therefore lowest ranked. It should be noted that if there was a high degree of source separation achieved within this system it was expected that the cost would decrease.

Cost Criteria Group - Overall System Ranking

Table 8.25 summarizes the system rankings from the cost perspective.

In overall system ranking, total waste management system cost was considered the most important criterion, while the cost per tonne diverted was used to differentiate between systems, if necessary. On this basis, Systems 1 through 6 were ranked the same, due to similar overall system costs.

TABLE 8.25

GTA IC&I
NET EFFECTS SUMMARY FOR COST

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing of All IC&I Waste
COST						
Cost (Overall Ranking)	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Highest ranked	Highest ranked
Diversion Cost ($ per tonne diverted)	Highest ranked due to: · $110/tonne	Highest ranked due to: · $112-114/tonne	Highest ranked due to: · $115/tonne	Highest ranked due to: · $117/tonne	Highest ranked due to: · $117/tonne	Lowest ranked due to: · $185/tonne
Total System Cost ($/year)	Highest ranked due to: · $367 million	Highest ranked due to: · $362-368 million	Highest ranked due to: · $358 million	Highest ranked due to: · $355 million	Highest ranked due to · $354 million	Lowest ranked due to: · $419 million

8.4.2 Municipal Finance Criteria Group (IC&I)

Under the Municipal Finance Criteria Group, only the criterion "Potential for Impact on Private Sector Industries" was considered in the IC&I 3Rs systems evaluation. As the total system cost difference among the alternative IC&I systems was relatively minor ($354 to $419 million), all IC&I systems were considered to be equal for this criteria group.

It should also be noted that the potential for impact on economic development was addressed under the Social Environment Criteria Group.

8.4.3 Natural Environment Criteria Group (IC&I)

The systems rankings by criterion were based on the "system net effects by criterion" and "advantages/disadvantages by criterion" documented in the individual system net effects tables contained in the Natural Environment Technical Appendix. The IC&I system rankings for the three natural environment criteria are discussed below. The rankings by criterion are summarized in Table 8.26.

Potential for Effects to Terrestrial Systems and Resources

For the IC&I 3Rs systems, effects to terrestrial systems and resources were predicted to occur as a result of expanding existing facilities or from siting new facilities. System 1 (Existing) and System 2 (Existing/Committed) for the IC&I sector do not require any new facilities. These two systems were both highest ranked for this criterion. Both Systems 3 and 4 (Extended 3Rs Regulations, Expanded 3Rs Regulations) require additional capacity to process larger quantities of dry recyclables. These systems include expansions to existing MRFs, to accommodate these increased quantities, or the siting of new MRFs. The potential effects due to these expansions or new facilities can largely be mitigated by siting facilities in areas of compatible land uses. As a result, Systems 3 and 4 were considered equally and ranked slightly lower than Systems 1 and 2 or third highest ranked. Systems 5 and 6 (Expanded 3Rs Regulations with Organics, Processing All IC&I Waste) require both additional processing capacity for dry recyclables and increased capacity for the composting of wet wastes. These systems will require the siting of new MRFs and new compost facilities.

TABLE 8.26

GTA IC&I
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing of All IC&I Waste
IMPACT						
Natural Environment (Overall Ranking)	Highest ranked with System 2	Highest ranked with System 1	Third highest ranked with System 4	Third highest ranked with System 3	Lowest ranked with System 6	Lowest ranked with System 5
Potential for effects to terrestrial systems and resources	Highest ranked due to: · necessary facilities already exist	Highest ranked due to: · necessary facilities already exist	Third highest ranked due to: · potential effects due to expanding existing MRFs or siting new MRFs	Third highest ranked due to: · potential effects due to expanding existing MRFs or siting new MRFs	Lowest ranked due to: · potential effects due to siting new MRFs and compost facilities	Lowest ranked due to: · potential effects due to siting new MRFs and compost facilities
Potential for effects to aquatic systems including surface and ground water resources	Highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities	Highest ranked due to: · necessary facilities already exist · potential effects due to discharges from existing facilities	Third highest ranked due to: · potential effects due to discharges from existing facilities · new or expanded MRFs required which may result in additional effects	Third highest ranked due to: · potential effects due to discharges from existing facilities · new or expanded MRFs required which may result in additional effects	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting new MRFs and compost facilities and discharges from new compost facilities	Lowest ranked due to: · potential effects due to discharges from existing facilities · potential effects due to siting new MRFs and compost facilities and discharges from new compost facilities

TABLE 8.26

GTA IC&I
NET EFFECTS SUMMARY FOR NATURAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing of All IC&I Waste
Potential for effects to the atmospheric environment	Highest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · no increased emissions since no increase in collection or IC&I organics processing	Highest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · no increased emissions since no increase in collection or IC&I organics processing	Third highest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · additional emissions due to increased collection vehicle requirements	Third highest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · additional emissions due to increased collection vehicle requirements	Lowest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · additional emissions due to increased collection vehicle requirements and IC&I organics processing	Lowest ranked due to: · emissions to atmosphere include: dust, odours, exhaust, bioaerosols and gases · additional emissions due to increased collection vehicle requirements and IC&I organics processing

The siting of these facilities is expected to result in a greater potential for effects to terrestrial systems due to the loss or removal of existing terrestrial features. Systems 5 and 6 were equally ranked lowest of the six systems.

Potential for Effects to Aquatic Systems Including Surface and Ground Water Resources

Potential effects to aquatic systems and water resources were expected to occur as a result of siting facilities and discharges from facilities. Effects may include the disruption of local surface water drainage patterns due to the siting of a facility or the discharge of contaminants from facilities. These discharges may include leachate and surface water runoff, containing silt and organic materials, from central compost facilities. The potential for effects due to discharges from existing 3Rs facilities was considered to be equal for all six of the IC&I systems. Systems 1 and 2 (Existing, Existing/Committed) required no new or expanded facilities. These two systems were considered to be highest ranked.

The new or expanded MRFs necessary to process increased quantities of dry recyclables in Systems 3 and 4 (Extended 3Rs Regulations, Expanded 3Rs Regulations) may result in some additional effects. These effects are expected to be minimal since no discharges are likely from these dry processes. Systems 3 and 4 were ranked slightly less than the first two systems and third highest. A significant increase in the quantity of wet wastes (IC&I organics) will be processed and composted in Systems 5 and 6 (Expanded 3Rs Regulations with Organics, Processing All IC&I Waste). Both systems required the siting of new MRFs and compost facilities. Potential effects are also expected due to discharges from the new compost facilities. Systems 5 and 6 were ranked equally lowest of the six IC&I systems.

Potential for Effects to the Atmospheric Environment

All six IC&I system alternatives were expected to have emissions to the atmospheric environment. These emissions included dust, odours, bioaerosols, and gases generated at MRFs, processing centres and compost facilities, with dust and exhaust emissions generated by waste collection vehicles. Emissions to the atmosphere are reduced by such measures as following proper operating procedures at the facility, installation of emission controls, regular facility cleaning and vehicle maintenance. Effects to the atmospheric environment from emissions were expected to increase with the level of collection vehicle requirements and amount of IC&I organics processed and composted at centralized facilities in large volumes. Systems 1 and 2 (Existing, Existing/Committed) maintain the

present level of waste collection service and IC&I organics processing, resulting in no increase in emissions. These two IC&I systems were equally ranked highest. Systems 3 and 4 (Extended 3Rs Regulations, Expanded 3Rs Regulations) require that increased quantities of dry recyclables be collected. As a result these systems had increased collection vehicle requirements and additional emissions to the atmosphere. These systems were both ranked third highest. The last two systems, Systems 5 and 6 (Expanded 3Rs Regulations with Organics, Processing All IC&I Waste), expected to have the greatest potential for effects to the atmospheric environment. Both systems included an increased level of IC&I organics collection and processing. These systems had the greatest requirements for collection vehicles. They also had the largest amount of IC&I organics processing and composting. Systems 5 and 6 were ranked lowest.

Natural Environment Criteria Group Overall System Ranking

Combining the ranking of systems by criterion with the criteria rankings allowed an overall system ranking to be completed for the Natural Environment Criteria Group. The Existing and Existing/Committed systems (Systems 1 and 2, respectively) were both ranked highest for each of the three criteria. These two systems do not require any new 3Rs facilities, increased vehicle collection requirements or increase in IC&I organics processing. Systems 1 and 2 will result in the lowest potential for effects to the natural environment. Systems 3 and 4 (Extended 3Rs Regulations, Expanded 3Rs Regulations) both require the expansion of existing MRFs or the siting of new MRFs. The siting of these new facilities may result in potential effects to both terrestrial systems and aquatic systems. Increased collection vehicle requirements are also required, resulting in additional emissions to the atmosphere. Systems 3 and 4 were ranked third highest for all these criteria. Overall, Systems 3 and 4 (Extended 3Rs Regulations, Expanded 3Rs Regulations) were also ranked third highest.

IC&I System 5 and System 6 (Expanded 3Rs Regulations with Organics, Processing All IC&I Waste) were both ranked lowest. These two systems required increased processing capacity for dry recyclables and IC&I organics. This included the siting of new MRFs and compost facilities. These systems were expected to have the greatest effects on terrestrial and aquatic systems due to siting new facilities and discharges from the new compost facilities. In addition, these systems had the largest collection vehicle requirements and largest amount of IC&I organics processing. Systems 5 and 6 were expected to have the greatest level of emissions to the atmosphere for all of the systems.

A list of the overall IC&I system ranking for the Natural Environment Criteria Group follows (highest ranked to lowest ranked):

1 - System 1 (Existing)
1 - System 2 (Existing/Committed)
3 - System 3 (Extended 3Rs Regulations)
3 - System 4 (Expanded 3Rs Regulations)
5 - System 5 (Expanded 3Rs Regulations with Organics)
5 - System 6 (Processing All IC&I Waste)

8.4.4 <u>Service Criteria Group (IC&I)</u>

The Service Criteria Group contains four criteria. These are:

- Reliability;
- Flexibility;
- Performance; and
- Social Acceptability.

For the Service Criteria Group, the individual criteria were ranked. This ranking was completed on the basis of the level of importance of the criteria relative to the others. In order to rank the criteria, consideration was given to the magnitude of effects, duration of effects, significance of effects, certainty of effects and the relative difference among options.

Three criteria, "Performance," "Reliability" and "Social Acceptability" were considered to be of greatest and equal importance for the IC&I Service Criteria. These criteria were given the highest ranking since, taken together, they provide the strongest and most reliable indication of whether any significant measure of waste diversion was likely to be achieved by the six IC&I systems considered. These criteria provided the best means of assessing the significance, certainty, and magnitude of effects, and highlight the difference among options.

Performance measured the amount of waste diversion (tonnes diverted expressed as a percentage of waste generation). This best assessed the significance and magnitude of waste diversion effects among the options. It has been assumed for the purpose of the evaluation that markets will be available for the materials diverted by these systems. Reliability measured whether systems were likely to work (due to technology and

operational factors) and whether the system as a whole was vulnerable to break-down. Reliability was necessary to guarantee the diversion level estimated for the systems.

Social acceptability measured whether institutions, mostly in the private sector, were likely to comply with system requirements that were fundamental to ensuring diversion, and therefore performance. This criterion was helpful in evaluating the certainty and duration of effects.

Flexibility was ranked lowest in importance of the four service criteria. This criterion evaluated the range of types and quantities of waste accepted by different systems, and whether these can be varied. The logic behind such a criterion was that systems which were proven to be incapable of expansion or modification were likely to be faced with greater challenges in terms of ensuring service and diversion, if the quantity and composition of the waste stream varied. However, this criterion was not considered as important in providing a waste management system.

The criteria rankings for the Service Criteria Group are presented in Table 8.27 along with the rationale for these rankings.

Reliability

The reliability of each system was judged according to whether the technologies which form the system had been proven reliable and had operated successfully in at least one jurisdiction in the world at full scale for a period of at least one year.

Since the variety of technologies within System 1 had been proven (specifically for the GTA), it was judged to be highest ranked with respect to reliability. System 2 (Existing and Existing/Committed), was also judged to be highest ranked, since it relied on the same variety of systems, and existing facilities were likely to handle the increase in diverted materials.

Systems 3, 4 and 5 (Extended 3Rs Regulations, Expanded 3Rs Regulations and Expanded 3Rs Regulations with Organics) were ranked lower in descending order. System 3 (Extended 3Rs Regulations) relied on the same variety of technologies as System 2 (Existing/Committed) but the amount of materials handled would be significantly greater. Also, the effect of extensive 3Rs regulations was not proven in any other jurisdiction at this time. System 4 (Expanded 3Rs Regulations) was also based on proven technology,

TABLE 8.27

GTA IC&I
NET EFFECTS SUMMARY FOR SERVICE

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
SERVICE						
Service	Second lowest ranked	Third highest ranked	Highest ranked	Second highest ranked	Third lowest ranked	Lowest ranked
Reliability	Highest ranked due to:	Highest ranked due to:	Second highest ranked due to:	Third highest ranked due to:	Second lowest ranked due to:	Lowest ranked due to:
· Proven technology	· technologies presently exist and are proven · technologies rely on voluntary source separation and recovery of recyclables	· technologies presently exist and are proven · impacts of 3Rs regulations proven in Rhode Island, N.Y. · success is partially dependent on the extent to which institutions are covered by regulations - it is unlikely that the regulations provide sufficient coverage to meet the 50% diversion objectives · success also depends on voluntary source separation and recovery of recyclables · success depends to some extent on effective monitoring and follow-up to ensure effective source separation and diversion	· technologies presently exist and are proven · success depends on effective design of regulations to identify and regulate generators who generate most (90%) of IC&I waste · impacts of extensive 3Rs regulations not proven · effective monitoring and follow-up required to ensure effective source separation and diversion	· technologies presently exist and are proven · success depends on effective design of regulations to identify and regulate generators who generate most (90%) of IC&I waste · impacts of extensive 3Rs regulations covering a wider range of mandated materials not proven · effective monitoring and follow-up required to ensure effective source separation and diversion	· technologies presently exist and are proven · success depends on effective design of regulations to identify and regulate generators who generate most (90%) of IC&I waste · impacts of extensive 3Rs regulations covering a wide range of dry materials, and also wet materials not proven · effective monitoring and follow-up required to ensure effective source separation and diversion	· System builds on existing/committed source separation requirements · technologies presently exis to process most, but not all, materials · may not be proven at larg scale · uncertainty regarding how requirement would be me by private sector companies

TABLE 8.27

GTA IC&I
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
Flexibility	Lowest ranked due to: · limited range and quantity of material diverted · range and quantity of materials accepted depends entirely on voluntary commitment	Second lowest ranked due to: · range of dry materials handled are defined by industrial sector and are limited · both range and quantity of materials diverted will depend on the coverage of the 3Rs regulations · increased processing capacity will be provided by private sector	Third lowest ranked due to: · designed to divert virtually all of the most easily recovered and marketable dry materials · both range and quantity of materials are defined by the expanded regulations · increased processing capacity may be required and will be provided by private sector	Third highest ranked due to: · collects wider range of dry materials · designed to divert virtually all of the major waste materials except wet organics · increased processing capacity may be required and will be provided by private sector	Second highest ranked due to: · ability to divert most dry and wet materials · designed to divert virtually all of the major waste materials including wet organics · increased processing capacity may be required for both wet and dry wastes, and will be provided by private sector	Highest ranked due to: · ability to divert wider range of wet and dry wastes · designed to recover virtually all recyclables · increased processing capacity may be required for wet, dry and specialized (eg C&D) wastes · markets will govern materials recovered in processing and effective diversion
Performance	Lowest ranked due to: · limited waste diversion of 25-32% (estimate approximate only, no firm data available)	Second lowest ranked due to: · limited waste diversion potential of 34%, 38% or 46% (low, medium and high estimates of number of organizations subject to regulations) respectively	Third lowest ranked due to: · estimated waste diversion potential of 53-58%	Third highest ranked due to: · estimated waste diversion potential of 61-67%	Second highest ranked due to: · estimated waste diversion potential of 68-73%	Highest ranked due to: · estimated waste diversion potential of up to 75-80%

TABLE 8.27

GTA IC&I
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
Social Acceptability	Second lowest ranked: · potential for least participation · small IC&I generators not significantly affected by regulations in Systems 1 and 2 · public and private operators appear willing to pay · potential for voluntary compliance by those not regulated greater than Systems 2-6	Third highest ranked: · potential for second least participation (applies to about 20% of operators) · small business operators not significantly affected by regulations in Systems 1 and 2 · potential for IC&I willingness to pay; some major IC&I establishments now implement regulations · potential increase in employee and corporate pride · potential for voluntary compliance by those not regulated, greater than Systems 3-6	Highest ranked: · potential for greater participation than Systems 1 and 2 but less than Systems 5 and 6 · many small operators will be required to comply; smallest operators not required to participate · potential for negative attitudinal effect by some IC&I generators because of increased regulation; potential for increase in employee pride · potential for voluntary compliance by those not regulated greater than Systems 4, 5 and 6 · market development improves IC&I sector attitudes to Systems 3, 4, 5 and 6 · greater enforcement required than Systems 1 and 2	Second highest ranked: · potential for greater participation than Systems 1 and 2 but less than 5 and 6 · many small operators will be required to comply; smallest operators not required to participate · potential for negative attitudinal effect by some IC&I generators because of increased regulation; potential for increase in employee pride · additional burden on many operators due to expanded sorting requirements (magnitude uncertain) · potential for voluntary compliance by those not regulated greater than Systems 5 and 6	Second lowest ranked: · potential for greater participation than Systems 1, 2, 3 and 4 but less than System 6 · market development improves IC&I sector attitudes to Systems 3, 4, 5 and 6 · second greatest potential negative attitudes from grocery and restaurant sector · second greatest negative attitude to System 5, particularly for small and independent private sector · cost of compliance higher for more small to medium size public and independent private operators than System 3 with more effects on grocery and restaurant sector; health and customer issues with restaurants due to storage and sorting food waste · potential for proportion of non-compliance to be higher with less voluntary compliance than systems 1, 2, 3 and 4	Lowest ranked: · potential for greatest participation as greatest proportion of IC&I sector is required to participate · market development improves IC&I sector attitudes to Systems 3, 4, and 6 · System 6 is the most cos to implement with the most significant cost of compliance on small to medium size public and independent private operators · greatest level of enforcement required · potential for non-compliance proportic highest with no additiona voluntary compliance

TABLE 8.27

GTA IC&I
NET EFFECTS SUMMARY FOR SERVICE
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
Social Acceptability			· cost of compliance greater than Systems 1 and 2	· market development improves IC&I sector attitudes to Systems 3, 4, 5 and 6 · greater enforcement required than Systems 1 and 2 · cost compliance greater than Systems 1, 2 and 3	· all but smallest operators required to participate · potential for proportion of non-compliance to be higher with less voluntary compliance than Systems 1, 2, 3 and 4	

but the scale was increased over Systems 2 and 3. Source separation and processing of some materials (such as some plastics), was not proven on a large scale. System 5 (Expanded 3Rs Regulations with Organics) was ranked second lowest since it built on Systems 3 and 4 and required technology to handle and process organics. The technology for processing organics is proven in North America but there are some on-going operational problems, generally related to odours and finished compost quality and markets.

System 6 (Processing All IC&I Waste) was lowest ranked because it required the variety of technologies required in Systems 3, 4 and 5 (at a somewhat larger scale) but also additional technologies to process the more varied waste stream involved (e.g. facilities handling and processing mixed dry IC&I wastes).

Flexibility

System flexibility was judged according to the types and quantities of waste accommodated. This criterion incorporated the ability of the system to adapt to changing waste characteristics and quantities. Whether the system would help GTA achieve Ontario targets for 50% waste diversion was also taken into account.

System 1 (Existing) was lowest ranked as it has the most limited range and quantity of material diverted. System 6 (Processing All IC&I Waste) was judged the highest ranked, as it handled the full range of IC&I waste materials generated within GTA. System 6 therefore potentially handled the greatest amount and the greatest range of material. Systems 2 through 5 were ranked in ascending order. The systems handle an increasing range and/or quantity of materials progressing from Systems 1 through 6. Systems 1 to 4 concentrate on an increasing variety of dry materials. System 5 (Expanded 3Rs Regulations with Organics) is ranked higher because it processes and diverts both dry and wet streams.

Performance

System performance was judged according to the amount of material diverted, expressed as a percentage of waste generation. System 6 (Processing All IC&I Waste) was highest ranked because it is estimated to divert the greatest quantity of material from disposal. System 1 (Existing) was lowest ranked as it diverts the least material from disposal.

Systems 2 through 5 successively increase the amount of material diverted, and were ranked in ascending order.

Social Acceptability

The social acceptability of each system was evaluated on the basis of the potential effects of the systems on IC&I sector participation, attitudes and perception of 3Rs activities and willingness to pay for the system.

Based on the above indicators, System 3 (Extended 3Rs Regulations) was highest ranked. It has the primary advantage of requiring a much higher level of participation (approximately 70% of all IC&I generators) than Systems 1 and 2, the same as System 4, slightly less than System 5 and moderately less than System 6. The system does not require the smallest operators, who are likely to have the greatest difficulty in implementing the regulations, to comply. The disadvantage of this system is that some smaller businesses, industries and institutions will need to comply with the regulations, with the possibility of negative attitudes and perceptions by owners/managers. These negative attitudes and perceptions will be focused primarily on the regulation for mandatory separation. It is assumed that these generators will have the option to either source separation or contract a collection service that will separate the materials at the MRF. Having the option to choose the system will likely improve its acceptability. The system may also encourage growth in employee pride and enthusiasm for 3Rs. The market development on the part of the government should be well received by the IC&I sector and is an advantage over System 1 for Systems 2, 3, 4, 5 and 6.

System 4 was ranked as the second highest. It has also the same components as System 3, but expands the list of dry recyclables. The effects of this system are similar to System 3, but with some potentially increased cost to generators.

System 2 was ranked third highest. It has the second least potential for participation. Small IC&I operators will not be significantly affected by this system and it is expected to be less costly to generators than Systems 3-6, with a resulting greater willingness to pay and more positive attitudes and perceptions on the part of the IC&I sector.

Systems 1 and 5 were ranked equally as the second lowest. System 1 has the least potential for increased participation. Most businesses, industries and institutions are unaffected by the regulations. Public and private operators appear willing to pay the current costs for waste management. System 5 has a slightly greater potential for participation than Systems 3 and 4 and much greater than System 1, but the effects of

mandatory separation of wet wastes are likely to elicit negative attitudes from the restaurant and grocery sector because of potential health, odour and vermin concerns and added costs from customers. System 5 is likely to apply to many small operators/owners in the restaurant and grocery sector, where compliance might be very difficult. There is likely to be less voluntary compliance than Systems 1, 2, 3 and 4.

System 6 was lowest ranked because although it will have the greatest participation, it is likely to be the most costly for individual operators to implement, and will affect the entire IC&I sector. It is likely to have particularly negative effects on small and medium sized businesses and institutions, as they may need additional storage space and staff time to source separate. They will also pay proportionally more than larger operators for a hauler to separate the materials. There will likely be negative attitudes towards this system. It will require the greatest level of enforcement because all generators will be regulated to comply and there is likely to be greater non-compliance.

Service Criteria Group - Overall System Ranking

Social acceptability, performance and reliability were considered of greatest importance, while flexibility was considered of less importance. Any system that received a mix of a lowest and highest ranking for reliability, performance and social acceptability (the top ranked criteria) were ruled out of contention as a highest ranked system.

Systems 3 and 4 (Extended 3Rs Regulations, Expanded 3Rs Regulations) were the highest ranked systems, using the ranking system discussed above. System 3 ranked highest for social acceptability and second highest for reliability and so, was ranked highest overall. Its performance was third highest, but was greater than 50% diversion, and was therefore considered acceptable. System 4 ranked second highest for social acceptability, while it ranked better than System 3 in terms of performance and flexibility because it diverted a greater range and quantity of materials from a wider selection of industrial sectors. Therefore, on balance it was considered second highest ranked.

Systems 2 (Existing/Committed) was ranked third highest. It was considered the most reliable, but it compared less favourably to Systems 3 and 4 (Extended 3Rs Regulations, Expanded 3Rs Regulations) in terms of performance, social acceptability and flexibility. It ranked higher than System 2 for flexibility and performance, and therefore on balance was also considered to be higher ranked, and was ranked third highest overall.

Systems 6 and 1 (Processing All IC&I Waste, Existing) were lowest ranked, for different reasons. The performance of System 6 was considered best, but it was considered lowest

ranked with respect to reliability and social acceptability. System 1 (Existing) was ranked most reliable, but in terms of performance it was lowest ranked and second lowest ranked for social acceptability. It was considered less flexible than System 6, but because social acceptability is considered a more important criterion, System 1 is considered higher ranked than System 6. Therefore, System 6 (Processing All IC&I Waste) is ranked lowest, and System 1 (Existing) second lowest.

System 5 (Expanded 3Rs Regulations with Organics) was ranked third lowest. Its performance was second highest but it was ranked lower than Systems 2, 3 and 4 in terms of reliability and social acceptability. It was ranked higher than System 1 for flexibility and equal to System 1 for social acceptability, therefore, overall it ranked higher than System 1.

In summary, the IC&I system ranking under the service criteria grouping was (highest ranked to lowest ranked):

1 - System 3 (Extended 3Rs Regulations)
2 - System 4 (Expanded 3Rs Regulations)
3 - System 2 (Existing/Committed)
3 - System 5 (Expanded 3Rs Regulations with Organics)
5 - System 1 (Existing)
6 - System 6 (Processing All IC&I Waste)

8.4.5 Social Environment Criteria Group (IC&I)

The system rankings by criterion were based on the "system net effects by criteria" and "advantages/disadvantages by criteria" contained in the individual system summary net effects tables contained in the Social Environment Technical Appendix. The system net effects were determined based on the successful application of mitigation/enhancement measures to the potential effect. The key "advantages/disadvantages" were listed for each criterion for each system in comparison to the other systems.

Net effects common to all systems were not carried forward to the evaluation of the system options because they did not assist in distinguishing among systems. Although the systems were named for the dominant element of the system (e.g., Processing of all IC&I Waste) the evaluation was based on the entire system and all of its components as described in Section 6.6. The system rankings for the three Social Environment Criteria are discussed below and summarized in Table 8.28. The overall system rankings can be found in the top row of Table 8.28.

Potential Local Community Impacts

Potential local community impacts could be anticipated as a result of siting new IC&I 3Rs facilities and due to expansion and increased use of existing facilities and non-optimal operating conditions. The potential effects of expanded use of existing facilities were taken to be the same for Systems 1 and 2 (Existing, Existing/Committed). Systems 1 (Existing) and 2 (Existing/Committed) have all the necessary facilities in place while the other systems require new facilities which have the potential to affect local communities. As a result, Systems 1 and 2 were equally considered the highest ranked.

Systems 3 (Extended 3Rs Regulations) and 4 (Expanded 3Rs Regulations) were ranked as the second highest because while they both required new MRFs for the processing of dry materials, no new compost facilities were required. Therefore, the potential displacement and disruption effects may be greater than Systems 1 and 2 (Existing, Existing/Committed) but less than Systems 5 and 6 (Expanded 3Rs Regulations with Organics, Processing All IC&I Waste).

System 5 (Expanded 3Rs Regulations with Organics) was ranked second lowest because it required new MRFs similar to Systems 3 and 4 and because of the need for more or expanded compost facilities, with the greater potential for odour effects from the "wet" waste that is associated with this system. These additions may result in additional nuisance effects on residents and special/sensitive groups due to additional odour effects, health concerns and increased traffic.

System 6 (Processing All IC&I Waste) was lowest ranked because the impacts associated with the new MRFs and composting facilities that would be required to process all IC&I materials in the GTA. Although similar to the effects from the facilities in System 5 (Expanded 3Rs Regulations with Organics), these effects are expected to be greater than Systems 1, 2, 3, 4, and 5.

Potential for Broad Social Impact

The systems were evaluated based on their potential positive and negative social impacts on the Region's broad social environment in terms of lifestyle, and the employment and economic development opportunities in the region over the planning period. The evaluation assumes that there will be existing markets for the end products from strong market development for all systems.

TABLE 8.28

GTA IC&I
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
IMPACT						
Social Environment (Overall Ranking)	Second highest ranked	Highest ranked	Second highest ranked	Second highest ranked	Second lowest ranked	Lowest ranked
Potential Local Community Impacts	Highest ranked due to: · no new facilities required · effects are due to increased use of existing facilities · least potential for nuisance and health effects on residents, special/sensitive groups, communities and community features and businesses	Highest ranked due to: · no new facilities required · effects are due to increased use of existing facilities · least potential for nuisance and health effects on residents, special/sensitive groups, communities and community features and businesses	Second highest ranked due to: · new MRFs will be required; no new compost facilities required · effects due to increased flow of materials and new MRFs · potential for displacement and disruption effects greater than Systems 1 and 2 but less than Systems 5 and 6	Second highest ranked due to: · new MRFs will be required; no new compost facilities required · effects due to increased flow of materials and new MRFs · potential for displacement and disruption effects greater than Systems 1 and 2 but less than Systems 5 and 6	Second lowest ranked due to: · new MRFs will be required · new or expanded compost facilities will be required · potential for significant odour effects from composting facilities · second most potential for nuisance effects, primarily associated with compost facilities · potential for displacement effects	Lowest ranked due to: · new MRFs and composting facilities required to process all IC&I materials in the GTA · significant potential for odour effects · greatest potential for nuisance effects and displacement

TABLE 8.28

GTA IC&I
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
Potential for Broad Social Impact	Third highest ranked due to: · places the least amount of regulation and the least cost on the IC&I sector · least potential to increase economies of scale for recyclables due to lower volumes and fewer types of materials than other systems · least potential to develop direct employment and economic opportunities in the waste management sector · third least potential to positively affect IC&I attitudes, perceptions, behaviour and operations · potential for negative operational effects on the IC&I sector	Highest ranked due to: · places the second least amount of regulation on the IC&I sector with increased cost over System 1 for major IC&I · second least potential to increase economies of scale for recyclables due to lower volumes and fewer types of materials than other systems · second least potential to develop employment and economic opportunities in the waste management sector · potential to positively affect IC&I attitudes, perceptions, behaviour and operations possibly greater than other systems but is likely to take more time · second least negative operational effects; restricted mainly to major IC&I who can accommodate the requirements better	Second highest ranked due to: · places the third least amount of regulation on the IC&I sector with increased costs over System 1 and 2 · third most potential to increase economies of scale for recyclables · third least potential to develop employment and economic opportunities in the waste management sector · second greatest potential to positively affect IC&I attitudes, perceptions, behaviour, and operations	Second highest ranked due to: · places the second most amount of regulation on the IC&I sector with increased costs over Systems 1, 2, 3 and 5 · second most potential to increase economies of scale for recyclables from greater volumes and types of materials · second most potential to develop employment and economic opportunities in the waste management sector · second greatest potential to positively affect IC&I attitudes, perceptions, behaviour, and operations	Second highest ranked · places the third most amount of regulation on the IC&I sector with increased costs over Systems 1, 2, and 3. Will affect a few types of businesses and institutions (grocery, hospitals, etc.) more. · third most potential to increase economies of scale for recyclables · third most potential to develop employment and economic opportunities in the waste management sector, primarily in composting · second least potential to positively affect IC&I attitudes, perceptions, behaviour and operations	Lowest ranked due to: · places the most amount of regulation on the IC&I sector with greatest cost increases to largest portion of the IC&I · greatest potential to increase economies of scale for recyclables and support recycling/green industries · greatest potential to develop employment and economic opportunities in the waste management sector as full and specialized service will be required · least potential to positively effect IC&I attitudes, perceptions, behaviour and operations · potential for greatest negative affect on operation of many IC&I from source separation of wet waste

TABLE 8.28

GTA IC&I
NET EFFECTS SUMMARY FOR SOCIAL ENVIRONMENT
(continued)

Goal/Criteria Group/Criteria	System 1 Existing	System 2 Existing/Committed	System 3 Extended 3Rs Regulations	System 4 Expanded 3Rs Regulations	System 5 Expanded 3Rs Regulations with Organics	System 6 Processing All IC&I Waste
Distribution of Social Costs and Benefits	Second highest ranked due to: · least potential for negative distribution effects from facilities as no new facilities are required · least potential positive effect for future generations · second most positive effect on distribution of regulation. Focus on construction and demolition landfill bans	Highest ranked due to: · least potential for negative distribution effects from facilities as no new facilities are required · potential positive effect for future generations (magnitude uncertain) · most positive distribution regulation effect. Avoids small businesses, but is broadly based	Second highest ranked due to: · third most potential for negative distribution effects from facilities with less facilities required and less potential community effects than Systems 5 and 6 · potential positive effect for future generations (magnitude uncertain) · second most positive distribution regulation effect. May avoid small businesses, is broadly based, but may include small to medium sized businesses	Second highest ranked due to: · third most potential for negative distribution effects from facilities with less facilities required and less potential community effects than Systems 5 and 6 · potential positive effect for future generations (magnitude uncertain) · second most positive distribution regulation effect. Avoids small businesses, is broadly based, but may include small to medium sized businesses	Lowest ranked due to: · second most potential for negative distribution effects from facilities, in particular compost facilities · potential positive effect for future generations (magnitude uncertain) · least positive distribution regulation effect. Only a few sectors (restaurants, grocery, hospitals, etc.) are the target of this system	Lowest ranked due to: · most potential for negative distribution effects from facilities, in particular compost facilities · potential for high positive effect for future generations (magnitude uncertain) · second least positive distribution regulation effect. Affects everyone, but appear to be few provisions for small businesses

System 2 (Existing/Committed) was highest ranked because it applied primarily to the major IC&I operations; those which are best able to pay for the additional costs. It also would likely have the greatest potential to positively affect IC&I attitudes, perceptions and behaviour, because the regulations in this system have been incorporated as a part of normal operations into some institutions, businesses and industry. Over a longer period of time, other operators would likely comply voluntarily with some of the regulations. However, it had the second least potential to develop economies of scale and employment and economic development opportunities in recycling industries because it would not provide as reliable supply of materials for recycling and green industries as Systems 3, 4, 5 and 6 (Extended 3Rs Regulations, Expanded 3Rs Regulations, Expanded 3Rs Regulations with Organics, Processing All IC&I Waste).

Systems 3, 4 and 5 (Extended 3Rs Regulations, Expanded 3Rs Regulations, Expanded 3Rs Regulations with Organics) were ranked equally as the second highest. While there were differences among them, these were not significant enough to rank one system ahead of the others. Systems 3 and 4 introduced fairly similar amounts of regulation on the IC&I sector. System 4 also had the second most potential for developing economies of scale and employment and economic development opportunities in recycling industries. The regulation placed on the IC&I sector in System 5, added additional requirements on the restaurants and grocery sector with potentially negative financial and operational implications. This system also had the second least potential to positively affect IC&I attitudes and behaviour.

System 1 (Existing) was ranked the third highest because it had the least potential to develop employment and economic development opportunities in the waste management sector and in the recycling industries (i.e., least reliable supply of materials), and had the third least potential to positively affect IC&I attitudes, perceptions and behaviours.

System 6 (Processing All IC&I Waste) was the lowest ranked. System 6 had the greatest potential for employment and economic development opportunities through the supply of greater volumes of material for industries. However, it introduced the greatest amount of regulation on the IC&I sector and was likely to result in the greatest increase in costs and operational requirements to the largest number of IC&I generators.

Distribution of Social Costs and Benefits

Potential distributional effects were predicted to occur as a result of lifestyle changes on some groups and changes in corporate behaviour in the region and on future generations.

System 2 (Existing/Committed) was determined to be the highest ranked because it had the least potential for negative distribution effects from facilities and had the potential for positive effects on future generations due to changes in corporate and employee behaviour. It also had a positive distribution regulation effect because it was broadly based across different sectors but avoided small businesses which were least able to pay for the programs.

Systems 1, 3 and 4 (Existing, Extended 3Rs Regulations, Expanded 3Rs Regulations) were ranked equally as the second highest. System 1 (Existing) has the least potential for negative distribution effects from facilities, the second most positive effect on distribution of regulation, but had the least potential positive effect for future generations as it did not appear that it would alter IC&I behaviour in the long term to the extent that the other systems would. Systems 3 and 4 (Extended 3Rs Regulations, Expanded 3Rs Regulations) had the third most potential for negative distribution effects from facilities, but also had the second most positive distribution regulation effect. It is likely that they will have the same potential positive future generational effect.

Systems 5 and 6 (Expanded 3Rs Regulations with Organics, Processing All IC&I Waste) were ranked equally as the lowest. System 6 was to have the most potential for negative distribution effects from facilities, but System 5 may have the least positive distribution effect of regulations. The potential for positive effect for future generations was uncertain.

Social Environment Criteria Group - Overall System Ranking

By considering the systems ranking by criteria and the criteria rankings (noting that all criteria are ranked equally), an overall system ranking could be completed for the Social Environment Criteria Group on a qualitative basis. The evaluation considered trade-offs among the rankings for each system and criterion recognizing that there may be significant potential effects from the 3Rs systems and the potential effects for each criterion may occur throughout the life of the system and some may continue beyond the planning period. The overall rankings are provided at the top of Table 8.28.

System 2 (Existing/Committed) was highest ranked system overall. It ranked highest for all three criteria.

Systems 1 (Existing), 3 (Extended 3Rs Regulations) and 4 (Expanded 3Rs Regulations) were ranked equally as the second highest overall. While Systems 3 and 4 were ranked the second highest for all three criteria, System 1 (Existing) was ranked the highest for

potential local community impacts, second highest for distribution of social costs and benefits and the third highest for potential for broad social impact. Therefore the systems were ranked equal.

System 5 (Expanded 3Rs Regulations with Organics) was ranked as the second lowest overall on the basis that it was the second highest for the potential for broad social impact, second lowest for the potential local community impacts and lowest for the distribution of social costs and benefits.

System 6 (Processing All IC&I Waste) was the lowest ranked, because it was ranked the lowest for all three criteria.

A list of the overall IC&I system ranking for the Social Environment Criteria Group follows (highest ranked to lowest ranked):

1 - System 2 (Existing/Committed)
2 - System 1 (Existing)
2 - System 3 (Extended 3Rs Regulations)
2 - System 4 (Expanded 3Rs Regulations)
5 - System 5 (Expanded 3Rs Regulations with Organics)
6 - System 6 (Processing All IC&I Waste)

8.5 Regional Diversion Estimates

The previous sections have discussed diversion estimates for six residential waste diversion systems in each of the Regions of Durham, Metro Toronto, York and Peel, and six IC&I systems for the GTA under the performance indicator of the Service Criteria Grouping. The disposal requirements for each Region could vary depending on which residential and IC&I systems are combined to form any waste diversion system. The Existing residential and IC&I systems are not considered in the combinations, as both the residential and IC&I Existing/Committed systems will be in place by 1996. Therefore, there are five potential residential systems (Existing/Committed, Direct Cost, Expanded Blue Box, Wet/Dry, and Mixed Waste) which could be combined with five potential IC&I systems (Existing/Committed, Extended 3Rs Regulations, Expanded 3Rs Regulations, Expanded 3Rs Regulations with Organics, and Processing All IC&I Waste), resulting in 25 possible combinations of residential and IC&I systems for each Region.

The cumulative tonnes of waste diverted through reduction and reuse/recycling, and the cumulative diversion (expressed as a percentage of total waste generated) achieved during

the 20-year period from 1996 to 2015 was estimated for the 25 potential system combinations for each of the three service areas (Peel, Durham, Metro/York). Diversion estimates are provided under both low and high diversion scenarios, which are primarily based on assumed participation rates in backyard composting. Tables 8.29 to 8.33 show the results of this analysis for the Regions of Durham, Metro Toronto, York, Metro and York combined, and Peel. The results are discussed on a Regional basis in Sections 8.5.1 to 8.5.5.

A number of points should be noted regarding the information presented in Tables 8.29 to 8.33. Firstly, the diversion percentages shown in these Tables are the cumulative diversion achieved over a 20-year period, from 1996 to 2015. These are different from the values presented in the Summary Net Effects Tables presented earlier in this chapter. The Summary Net Effects Tables show a one year snapshot of the diversion that could be achieved by any of the residential systems at a Regional level, and the IC&I systems at the GTA level in the year 2000, assuming that the system in question is fully operational in the year 2000, and has achieved a 5% source reduction value, measured against a 1992 level. The two sets of numbers are different, and should not be confused with one another.

Secondly, the source reduction assumptions used in each residential and IC&I system are the same, therefore the cumulative 20-year reduction (which varied from 8% to 9%) will be the same for all system combinations on a Regional basis. The slight difference in the cumulative source reduction estimate from one Region to another is related to slight differences in the IC&I source reduction value which results from long term changes in the employment profiles of different Regions.

Finally, the actual level of waste diversion achieved in each of the primary service areas will be influenced by a number of factors including the diversion approach pursued in each Region and external influences. These external influences, such as economic growth and our international competitiveness, will affect the development of local markets for recycled materials and the waste minimization efforts within the industry.

The source reduction assumptions used for the analysis are discussed below.

Residential Sector Source Reduction

A conservative residential source reduction estimate increasing from 0% in 1992 to 5% by the year 2000, and increasing in increments of 0.5% per year from the year 2000 to 2015 was applied to the residential waste generation estimates. The 5% source reduction value

was considered reasonable based on the likely impacts of NAPP on packaging waste, and some increases in reuse activities. This value compares to objectives set or met in other jurisdictions in North America (see Schedule in Service Appendix on source reduction). The increment of 0.5% per year from the year 2000 to 2015 is considered a modest, but reasonable allowance to account for behaviour change which may occur as a result of increased awareness of waste reduction issues over time.

IC&I Sector Source Reduction

Source reduction by the IC&I sector will be due to three factors, which are:

- changes in economic activity and the employment profile of each Region;
- innovation leading to reduced waste generation, (assumed to increase by an annual increment of 0.5% from 1993 to 2015);
- improved waste management practices in the C&D sector (assumed to increase by an annual increment of 0.25% per year from 1993 to 2015).

The methods used to estimate source reduction as a result of these three factors is described below.

IC&I Sector Source Reduction due to Changes in the Employment Profile of each GTA Region

Future employment in each major IC&I sector in each Region was compared to current employment to determine if there was a major shift towards IC&I groups which have traditionally been lower waste generators. The IC&I per employee generation rates presented in the Service Technical Appendix were used to adjust future generation estimates. This was carried out by assuming that Regional IC&I waste generation would continue at the rates experienced around 1987.

IC&I Sector Source Reduction due to Innovation

The IC&I sector (excluding the construction and demolition (C&D) sector which is addressed separately) is expected to reduce the generation of some wastes over the planning period through modernization, process change, increased operational efficiencies,

etc. While it is the generally accepted that this trend is occurring and will continue, because of global competition, etc., very little quantitative data are available on the impacts of this trend on future IC&I waste generation for the whole IC&I sector. Many case studies quote exceptional programs where significant reductions have been achieved. However, these are high profile examples of innovative behaviour and can not be applied to the total IC&I sector for waste generation estimates. A modest allowance of 0.5% per year in source reduction of IC&I waste, starting in 1993, and continuing to the year 2015 (when the source reduction increment would be 11.5%) was used for this analysis.

IC&I Sector Source Reduction in the C&D Sector

C&D waste was separated from IC&I waste for this analysis, as its method of generation is different from other IC&I wastes. The C&D industry will also innovate, and continue to develop more efficient construction methods. An allowance of 0.25% per year, beginning in 1993, and increasing by increments of 0.25% per year from 1993 to 2015 was applied to estimate reduction in C&D waste generation each year, on this basis, reduction of C&D waste would reach 5.25% by the year 2015.

The resulting 20-year cumulative diversion estimates are discussed by Region in the following sections.

8.5.1 Region of Durham

Table 8.29 shows that the 25 combinations of residential and IC&I systems can divert a range of 4 million to 8.2 million tonnes of waste in Region of Durham between 1996 and 2015. This translates to 41% to 83% of the Durham waste stream. At the low end of the range, the combination of Existing/Committed residential and IC&I systems divert an estimated 41% of the waste generated between 1996 and 2015, by the year 2015. This totals 4.0 million tonnes of diversion in the 20-year period, made up of an estimated 3.1 million tonnes (32%) of waste reused/recycled, and 0.9 million tonnes (9%) of waste reduced. Other combinations of residential and IC&I systems achieve higher diversions. The highest potential diversion is achieved by the combination of Mixed Waste Processing of residential waste (with marketing of finished compost), and a policy of Processing All IC&I Waste. This combination could reasonably divert 7.4 to 8.2 million tonnes (75% to 83%) in the 20-year period. The range relates to the quality of the finished compost from the mixed waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 22 could reasonably achieve diversion of at least 50% of waste generated over the 20-year planning period. Almost one-fifth (9% of the waste stream) of the estimated diversion is assumed to occur through source reduction, which would be feasible if a sustained promotion, education, and support program focused on source reduction by both the residential and IC&I sectors.

8.5.2 Metro Toronto

Table 8.30 shows that the 25 combinations of residential and IC&I systems could divert a range of 22.8 million to 48.3 million tonnes of waste in Metro Toronto between 1996 and 2015. This translates to 38% to 81% of the Metro Toronto waste stream. At the low end of the range, the combination of Existing/Committed residential and IC&I systems could reasonably divert an estimated 38% of the waste generated between 1996 and 2015, by the year 2015. This totals 22.8 million tonnes of diversion in the 20-year period, made up of an estimated 17.2 million tonnes (29%) of waste reused/recycled, and 5.6 million tonnes (9%) of waste reduced. Other combinations of residential and IC&I systems could reasonably achieve higher diversions. The highest potential diversion is achieved by the combination of Mixed Waste Processing of residential waste (with marketing of finished compost), and a policy of Processing All IC&I Waste. This combination could reasonably to divert 43.5 to 48.3 million tonnes (73% to 81%) in the 20-year period. The range relates to the quality of the finished compost from the Mixed Waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 20 could reasonably achieve diversion of at least 50% of waste generated over the 20-year planning period. Almost one-fifth (9% of the waste stream) of the estimated diversion is assumed to occur through source reduction, which would be feasible if a sustained promotion, education, and support program focused on source reduction by both the residential and IC&I sectors.

8.5.3 Region of York

Table 8.31 shows that the 25 combinations of residential and IC&I systems could divert a range of 7.6 to million to 15.1 million tonnes of waste in Region of York between 1996 and 2015. This translates to 42% to 83% of the Region of York waste stream. At the low end of the range, the combination of Existing/Committed residential and IC&I systems divert an estimated 42% of the waste generated between 1996 and 2015, by the year 2015. This totals 7.6 million tonnes of diversion in the 20-year period, made up of an estimated 5.9 million tonnes (33%) of waste reused/recycled, and 1.7 million tonnes

(9%) of waste reduced. Other combinations of residential and IC&I systems achieve higher diversions. The highest potential diversion is achieved by the combination of Mixed Waste Processing of residential waste (with marketing of finished compost), and a policy of Processing All IC&I Waste. This could reasonably divert 14.1 to 15.1 million tonnes (77% to 83% of the waste stream) in the 20-year period. The range relates to the quality of the finished compost from the Mixed Waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 22 could reasonably achieve diversion of at least 50% of waste generated over the 20-year planning period. Almost one-fifth (9% of the waste stream) of the estimated diversion is assumed to occur through source reduction, which could be feasible if a sustained promotion, education, and support program focused on source reduction by both the residential and IC&I sectors.

8.5.4 Combined Metro Toronto and Region of York

Table 8.32 shows that the 25 combinations of residential and IC&I systems could divert a range of 30.4 million to 63.4 million tonnes of waste in Metro Toronto and Region of York combined between 1996 and 2015. This translates to 39% to 82% of the combined waste stream from the two Regions, which make up one service area. At the low end of the range, the combination of Existing/Committed residential and IC&I systems divert an estimated 39% of the waste generated between 1996 and 2015, by the year 2015. This totals 30.4 million tonnes of diversion in the 20-year period, made up of an estimated 23.1 million tonnes (30%) of waste reused/recycled, and 7.3 million tonnes (9%) of waste reduced. Other combinations of residential and IC&I systems achieve higher diversions. The highest potential diversion is achieved by the combination of Mixed Waste processing of residential waste (with marketing of finished compost), and a policy of Processing All IC&I Waste. This combination could reasonably to divert 57.6 to 63.4 million tonnes (74% to 82%) in the 20-year period. The range relates to the quality of the finished compost from the Mixed Waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 21 could reasonably achieve diversion of at least 50% of waste generated over the 20-year planning period. Almost one fifth (9% of the waste stream) of the estimated diversion is assumed to occur through source reduction, which could be feasible if a sustained promotion, education, and support program focused on source reduction by both the residential and IC&I sectors.

8.5.5 Region of Peel

Table 8.33 shows that the 25 combinations of residential and IC&I systems could divert a range of 9.4 million to 19.6 million tonnes of waste in Region of Peel between 1996 and 2015. This translates to 40% to 82% of the Region of Peel waste stream. At the low end of the range, the combination of Existing/Committed residential and IC&I systems divert an estimated 40% of the waste generated between 1996 and 2015, by the year 2015. This totals 9.4 million tonnes of diversion in the 20-year period, made up of an estimated 7.4 million tonnes (31%) of waste reused/recycled, and 2.0 million tonnes (8%) of waste reduced. Other combinations of residential and IC&I systems achieve higher diversions. The highest potential diversion is achieved by the combination of Mixed Waste Processing of residential waste (with marketing of finished compost), and a policy of Processing All IC&I Waste. This combination is could reasonably divert 17.8 to 19.6 million tonnes (75% to 82%) in the 20-year period. The range relates to the quality of the finished compost from the mixed waste plant, and whether it can be classified for unrestricted use.

Of the 25 system combinations considered, 21 could reasonably achieve diversion of at least 50% of waste generated over the 20-year planning period. A portion (8% of the waste stream) of the estimated diversion is assumed to occur through source reduction, which could be feasible if a sustained promotion, education, and support program focused on source reduction by both the residential and IC&I sectors.

8.5.6 Conclusion

The diversion impacts of a range of residential and IC&I systems were estimated for the three service areas for which landfills are proposed by the Interim Waste Authority. The estimates show that of the 25 combinations considered, at least 21 could reasonably divert 50% or more of the generated waste stream in the 20-year period between 1996 and 2015. All estimates have assumed that up to one-fifth of the diversion will be achieved through source reduction by the residential and IC&I sectors. A sustained promotion, education and support program for source reduction would help achieve this result.

TABLE 8.29

SUMMARY OF DIVERSION DATA FOR COMBINATION OF RESIDENTIAL AND IC&I SYSTEMS DURHAM REGION

Scenario		Cumulative Diversion (2015)									
		Reduction		Reuse/Recycling				Total Diversion			
Residential	IC&I	%	tonnes (millions)	%		tonnes (millions)		%		tonnes (millions)	
				Low	High	Low	High	Low	High	Low	High
Existing Committed	Existing/ Committed	9%	0.90	32%		3.10		41%		4.00	
	Extended 3Rs	9%	0.90	40%		3.97		50%		4.87	
	Expanded 3Rs	9%	0.90	45%		4.43		54%		5.32	
	Expanded 3Rs with Organics	9%	0.90	48%		4.73		57%		5.63	
	No Unprocessed Waste to Landfill	9%	0.90	53%		5.19		62%		6.09	
Direct Cost	Existing/ Committed	9%	0.90	38%	40%	3.74	3.96	47%	49%	4.63	4.86
	Extended 3Rs	9%	0.90	47%	49%	4.60	4.83	56%	58%	5.50	5.72
	Expanded 3Rs	9%	0.90	52%	54%	5.06	5.29	61%	63%	5.96	6.18
	Expanded 3Rs with Organics	9%	0.90	55%	57%	5.37	5.59	64%	66%	6.27	6.49
	No Unprocessed Waste to Landfill	9%	0.90	59%	62%	5.83	6.05	68%	71%	6.73	6.95
Expanded Blue Box	Existing/ Committed	9%	0.90	40%	43%	3.94	4.26	49%	52%	4.83	5.16
	Extended 3Rs	9%	0.90	49%	52%	4.80	5.13	58%	61%	5.70	6.02
	Expanded 3Rs	9%	0.90	54%	57%	5.26	5.59	63%	66%	6.16	6.48
	Expanded 3Rs with Organics	9%	0.90	57%	60%	5.57	5.89	66%	69%	6.47	6.79
	No Unprocessed Waste to Landfill	9%	0.90	61%	65%	6.03	6.35	70%	74%	6.92	7.25
Wet Dry	Existing/ Committed	9%	0.90	46%	47%	4.50	4.61	55%	56%	5.39	5.50
	Extended 3Rs	9%	0.90	55%	56%	5.36	5.47	64%	65%	6.26	6.37
	Expanded 3Rs	9%	0.90	59%	60%	5.82	5.93	68%	69%	6.72	6.83
	Expanded 3Rs with Organics	9%	0.90	62%	63%	6.13	6.24	71%	73%	7.03	7.14
	No Unprocessed Waste to Landfill	9%	0.90	67%	68%	6.59	6.70	76%	77%	7.49	7.59
Mixed Waste Processing	Existing/ Committed	9%	0.90	45%	53%	4.43	5.21	54%	62%	5.32	6.11
	Extended 3Rs	9%	0.90	54%	62%	5.29	6.08	63%	71%	6.19	6.98
	Expanded 3Rs	9%	0.90	59%	67%	5.75	6.54	68%	76%	6.65	7.44
	Expanded 3Rs with Organics	9%	0.90	62%	70%	6.06	6.85	71%	79%	6.95	7.74
	No Unprocessed Waste to Landfill	9%	0.90	66%	74%	6.52	7.30	75%	83%	7.41	8.20

TABLE 8.30

SUMMARY OF DIVERSION DATA FOR COMBINATION OF RESIDENTIAL AND IC&I SYSTEMS METRO TORONTO

Scenario		Cumulative Diversion (2015)									
		Reduction		Reuse/Recycling				Total Diversion			
Residential	IC&I	%	tonnes (millions)	%		tonnes (millions)		%		tonnes (millions)	
				Low	High	Low	High	Low	High	Low	High
Existing/ Committed	Existing/ Committed	9%	5.63	29%		17.14		38%		22.77	
	Extended 3Rs	9%	5.63	38%		22.52		47%		28.16	
	Expanded 3Rs	9%	5.63	43%		25.37		52%		31.01	
	Expanded 3Rs with Organics	9%	5.63	46%		27.27		55%		32.91	
	No Unprocessed Waste to Landfill	9%	5.63	51%		30.12		60%		35.76	
Direct Cost	Existing/ Committed	9%	5.63	34%	37%	19.95	22.08	43%	47%	25.58	27.72
	Extended 3Rs	9%	5.63	43%	46%	25.33	27.47	52%	56%	30.97	33.10
	Expanded 3Rs	9%	5.63	48%	51%	28.18	30.32	57%	61%	33.82	35.95
	Expanded 3Rs with Organics	9%	5.63	51%	54%	30.08	32.22	60%	64%	35.72	37.85
	No Unprocessed Waste to Landfill	9%	5.63	56%	59%	32.93	35.07	65%	69%	38.57	40.70
Expanded Blue Box	Existing/ Committed	9%	5.63	35%	40%	20.91	23.51	45%	49%	26.54	29.14
	Extended 3Rs	9%	5.63	44%	49%	26.29	28.89	54%	58%	31.93	34.53
	Expanded 3Rs	9%	5.63	49%	54%	29.14	31.74	59%	63%	34.78	37.38
	Expanded 3Rs with Organics	9%	5.63	52%	57%	31.04	33.64	62%	66%	36.68	39.28
	No Unprocessed Waste to Landfill	9%	5.63	57%	62%	33.90	36.49	67%	71%	39.53	42.13
Wet/Dry	Existing/ Committed	9%	5.63	40%	45%	23.65	26.76	49%	55%	29.29	32.40
	Extended 3Rs	9%	5.63	49%	54%	29.04	32.15	58%	64%	34.67	37.78
	Expanded 3Rs	9%	5.63	54%	59%	31.89	35.00	63%	68%	37.52	40.63
	Expanded 3Rs with Organics	9%	5.63	57%	62%	33.79	36.90	66%	72%	39.42	42.53
	No Unprocessed Waste to Landfill	9%	5.63	62%	67%	36.64	39.75	71%	77%	42.27	45.38
Mixed Waste Processing	Existing/ Committed	9%	5.63	42%	50%	24.86	29.68	51%	60%	30.50	35.31
	Extended 3Rs	9%	5.63	51%	59%	30.25	35.06	60%	69%	35.88	40.69
	Expanded 3Rs	9%	5.63	56%	64%	33.10	37.91	65%	73%	38.73	43.54
	Expanded 3Rs with Organics	9%	5.63	59%	67%	35.00	39.81	68%	77%	40.63	45.45
	No Unprocessed Waste to Landfill	9%	5.63	64%	72%	37.85	42.66	73%	81%	43.48	48.30

TABLE 8.31

SUMMARY OF DIVERSION DATA FOR COMBINATION OF RESIDENTIAL AND IC&I SYSTEMS YORK REGION

Scenario		Cumulative Diversion (2015)									
		Reduction		Reuse/Recycling				Total Diversion			
Residential	IC&I	%	tonnes (millions)	% Low	% High	tonnes (millions) Low	tonnes (millions) High	% Low	% High	tonnes (millions) Low	tonnes (millions) High
Existing/ Committed	Existing/ Committed	9%	1.67	33%		5.94		42%		7.61	
	Extended 3Rs	9%	1.67	43%		7.89		52%		9.56	
	Expanded 3Rs	9%	1.67	49%		8.92		58%		10.59	
	Expanded 3Rs with Organics	9%	1.67	53%		9.61		62%		11.28	
	No Unprocessed Waste to Landfill	9%	1.67	58%		10 65		67%		12.32	
Direct Cost	Existing/ Committed	9%	1.67	37%	39%	6.81	7.15	46%	48%	8.48	8.82
	Extended 3Rs	9%	1.67	48%	50%	8.76	9.10	57%	59%	10.43*	10.77
	Expanded 3Rs	9%	1.67	54%	55%	9.80	10.14	63%	65%	11.47	11.81
	Expanded 3Rs with Organics	9%	1.67	57%	59%	10.49	10.83	67%	68%	12.16	12.50
	No Unprocessed Waste to Landfill	9%	1.67	63%	65%	11.52	11.86	72%	74%	13.19	13.53
Expanded Blue Box	Existing/ Committed	9%	1.67	39%	41%	7.06	7.49	48%	50%	8.73	9.16
	Extended 3Rs	9%	1.67	49%	52%	9.01	9.44	58%	61%	10.68	11 11
	Expanded 3Rs	9%	1.67	55%	57%	10.05	10.47	64%	66%	11.72	12.14
	Expanded 3Rs with Organics	9%	1.67	59%	61%	10.74	11.16	68%	70%	12.41	12.83
	No Unprocessed Waste to Landfill	9%	1.67	64%	67%	11.77	12.19	74%	76%	13.44	13.86
Wet/Dry	Existing/ Committed	9%	1.67	42%	44%	7.75	7.99	52%	53%	9.42	9.66
	Extended 3Rs	9%	1.67	53%	54%	9.70	9.94	62%	64%	11.37	11.61
	Expanded 3Rs	9%	1.67	59%	60%	10.73	10.98	68%	69%	12.40	12 65
	Expanded 3Rs with Organics	9%	1.67	63%	64%	11.42	11.66	72%	73%	13.09	13.34
	No Unprocessed Waste to Landfill	9%	1.67	68%	70%	12.45	12.70	77%	79%	14.12	14.37
Mixed Waste Processing	Existing/ Committed	9%	1.67	42%	48%	7.71	8.75	51%	57%	9.38	10.42
	Extended 3Rs	9%	1.67	53%	59%	9.66	10.70	62%	68%	11.33	12.37
	Expanded 3Rs	9%	1.67	59%	64%	10.69	11.74	68%	73%	12.36	13.41
	Expanded 3Rs with Organics	9%	1.67	62%	68%	11.38	12.42	71%	77%	13.05	14.09
	No Unprocessed Waste to Landfill	9%	1.67	68%	74%	12.41	13.46	77%	83%	14.08	15.13

TABLE 8.32

SUMMARY OF DIVERSION DATA FOR COMBINATION OF RESIDENTIAL AND IC&I SYSTEMS COMBINATION OF METRO TORONTO AND YORK REGION

Scenario		Cumulative Diversion (2015)									
		Reduction		Reuse/Recycling				Total Diversion			
Residential	IC&I	%	tonnes (millions)	%		tonnes (millions)		%		tonnes (millions)	
				Low	High	Low	High	Low	High	Low	High
Existing/ Committed	Existing/ Committed	9%	7.30	30%		23.08		39%		30.38	
	Extended 3Rs	9%	7.30	39%		30.41		49%		37.72	
	Expanded 3Rs	9%	7.30	44%		34.30		54%		41.60	
	Expanded 3Rs with Organics	9%	7.30	48%		36.89		57%		44.19	
	No Unprocessed Waste to Landfill	9%	7.30	53%		40.77		62%		48.07	
Direct Cost	Existing/ Committed	9%	7.30	34%	38%	26.76	29.24	44%	47%	34.07	36.54
	Extended 3Rs	9%	7.30	44%	47%	34.10	36.57	53%	57%	41.40	43.88
	Expanded 3Rs	9%	7.30	49%	52%	37.98	40.46	58%	62%	45.28	47.76
	Expanded 3Rs with Organics	9%	7.30	52%	55%	40.57	43.05	62%	65%	47.87	50.35
	No Unprocessed Waste to Landfill	9%	7.30	57%	60%	44.45	46.93	67%	70%	51.76	54.23
Expanded Blue Box	Existing/ Committed	9%	7.30	36%	40%	27.97	31.00	45%	49%	35.28	38.30
	Extended 3Rs	9%	7.30	46%	49%	35.31	38.33	55%	59%	42.61	45.64
	Expanded 3Rs	9%	7.30	51%	54%	39.19	42.22	60%	64%	46.50	49.52
	Expanded 3Rs with Organics	9%	7.30	54%	58%	41.78	44.80	63%	67%	49.09	52.11
	No Unprocessed Waste to Landfill	9%	7.30	59%	63%	45.66	48.69	68%	72%	52.97	55.99
Wet/Dry	Existing/ Committed	9%	7.30	40%	45%	31.40	34.75	50%	54%	38.71	42.06
	Extended 3Rs	9%	7.30	50%	54%	38.74	42.09	59%	64%	46.04	49.39
	Expanded 3Rs	9%	7.30	55%	59%	42.62	45.97	64%	69%	49.93	53.28
	Expanded 3Rs with Organics	9%	7.30	58%	63%	45.21	48.56	68%	72%	52.51	55.87
	No Unprocessed Waste to Landfill	9%	7.30	63%	68%	49.09	52.45	73%	77%	56.40	59.75
Mixed Waste Processing	Existing/ Committed	9%	7.30	42%	50%	32.57	38.43	51%	59%	39.87	45.73
	Extended 3Rs	9%	7.30	51%	59%	39.90	45.76	61%	68%	47.21	53.07
	Expanded 3Rs	9%	7.30	56%	64%	43.79	49.65	66%	73%	51.09	56.95
	Expanded 3Rs with Organics	9%	7.30	60%	67%	46.38	52.24	69%	77%	53.68	59.54
	No Unprocessed Waste to Landfill	9%	7.30	65%	72%	50.26	56.12	74%	82%	57.56	63.42

TABLE 8.33

SUMMARY OF DIVERSION DATA FOR COMBINATION OF RESIDENTIAL AND IC&I SYSTEMS PEEL REGION

Scenario		Cumulative Diversion (2015)									
		Reduction		Reuse/Recycling				Total Diversion			
Residential	IC&I	%	tonnes (millions)	% Low	% High	tonnes (millions) Low	tonnes (millions) High	% Low	% High	tonnes (millions) Low	tonnes (millions) High
Existing Committed	Existing/ Committed	8%	2.02	31%		7.39		40%		9.41	
	Extended 3Rs	8%	2.02	41%		9.77		49%		11.78	
	Expanded 3Rs	8%	2.02	46%		11.02		55%		13.04	
	Expanded 3Rs with Organics	8%	2.02	50%		11.86		58%		13.88	
	No Unprocessed Waste to Landfill	8%	2.02	55%		13.12		64%		15.13	
Direct Cost	Existing/ Committed	8%	2.02	36%	39%	8.68	9.29	45%	47%	10.70	11.30
	Extended 3Rs	8%	2.02	46%	49%	11.05	11.66	55%	57%	13.07	13.68
	Expanded 3Rs	8%	2.02	52%	54%	12.31	12.92	60%	63%	14.33	14.93
	Expanded 3Rs with Organics	8%	2.02	55%	58%	13.15	13.75	64%	66%	15.17	15.77
	No Unprocessed Waste to Landfill	8%	2.02	61%	63%	14.40	15.01	69%	72%	16.42	17.03
Expanded Blue Box	Existing/ Committed	8%	2.02	36%	39%	8.58	9.37	45%	48%	10.59	11.39
	Extended 3Rs	8%	2.02	46%	49%	10.95	11.74	54%	58%	12.97	13.76
	Expanded 3Rs	8%	2.02	51%	55%	12.21	13.00	60%	63%	14.22	15.02
	Expanded 3Rs with Organics	8%	2.02	55%	58%	13.05	13.84	63%	67%	15.06	15.86
	No Unprocessed Waste to Landfill	8%	2.02	60%	63%	14.30	15.10	69%	72%	16.32	17.11
Wet Dry	Existing/ Committed	8%	2.02	42%	45%	10.03	10.81	51%	54%	12.05	12.83
	Extended 3Rs	8%	2.02	52%	55%	12.41	13.19	61%	64%	14.42	15.20
	Expanded 3Rs	8%	2.02	57%	61%	13.66	14.44	66%	69%	15.68	16.46
	Expanded 3Rs with Organics	8%	2.02	61%	64%	14.50	15.28	69%	73%	16.52	17.30
	No Unprocessed Waste to Landfill	8%	2.02	66%	69%	15.76	16.54	75%	78%	17.77	18.55
Mixed Waste Processing	Existing/ Committed	8%	2.02	42%	50%	10.04	11.88	51%	58%	12.06	13.90
	Extended 3Rs	8%	2.02	52%	60%	12.42	14.25	61%	68%	14.43	16.27
	Expanded 3Rs	8%	2.02	57%	65%	13.67	15.51	66%	74%	15.69	17.53
	Expanded 3Rs with Organics	8%	2.02	61%	69%	14.51	16.35	69%	77%	16.53	18.36
	No Unprocessed Waste to Landfill	8%	2.02	66%	74%	15.77	17.60	75%	82%	17.78	19.62

9.0 SUMMARY AND CONCLUSIONS

Section 15 of *Waste Management Act*, 1992 (WMA) stipulates that the environmental assessments for the IWA landfill waste disposal sites are to contain, among other matters, a description of, a statement of rationale for, and a description and evaluation of any matter relating to reduction, reuse and recycling of waste (3Rs) as an alternative to the landfill waste disposal sites. This report meets that requirement.

The Act (Section 14) also stipulates that for each site proposed by the IWA as an undertaking, the Minister of the Environment is to provide a written estimate to the IWA as to the amount of waste expected to be diverted from the proposed landfill waste disposal site by waste reduction, and by waste reuse and recycling. These estimates were provided by Minister's letter dated May 15, 1992. This report provides additional analysis of 3Rs activities in support of the waste diversion estimates previously provided.

While the WMA treats reduction, reuse and recycling as specific waste management practices, they are more properly, broad labels for a range of waste management practices. To meet the objectives and requirements of the WMA, a more refined examination was conducted of 3Rs specific approaches which are reasonable for the three primary service areas under consideration. In this report, these are termed 3Rs system alternatives. These 3Rs system alternatives are analyzed and evaluated to demonstrate the range of effects which may be expected from reduction, reuse and recycling as an alternative to landfill waste disposal.

In conducting the 3Rs work, and providing estimates of waste that will not require disposal in the IWA established sites, MOEE is acting as a reliable authority in accordance with its legislative mandate, and not as the proponent or co-proponent of any of the 3Rs systems discussed. The alternatives presented in this report are not in any way structured as detailed implementation plans for the Province, the Regions or the private sector.

The following summarizes the results of the analysis.

9.1 Evaluation of 3Rs

As documented in this report, the GTA 3Rs Analysis:

- considered a reasonable range of 3Rs alternatives;
- considered the full definition of the environment;
- systematically evaluated the net effects of the options being considered; and
- considered public views on waste diversion.

3Rs System Alternatives

Through a systematic process as previously discussed in this report, alternative 3Rs systems were developed which are comprised of combinations of 3Rs programs, technologies and practices that could reasonably be implemented in the GTA. The alternative systems were designed to evaluate the relative effectiveness of different "core" components. These "core" components are not mutually exclusive and could be blended to produce different system designs which might be more effective for a given municipality or for the private sector.

Including the Existing (do-nothing alternative) and Existing/Committed system, six residential and six IC&I 3Rs systems were developed. The number of potential systems which could be developed from combinations of system components is very large. The systems which were developed were those considered to be reasonable for implementation in the GTA. There were no "red herrings", i.e. systems deemed impractical or unreasonable. In addition to the system combination possibilities, there is a wide menu of "enhancement" components presented in Section 7.6.2 which can be drawn upon to improve the performance of any given system.

The residential systems were developed specific to the four municipalities of the GTA where as the IC&I 3Rs systems were applied to the GTA as a whole. This study did not attempt to develop an optimal system for each service area as that would require site-specific analysis and policy considerations beyond the scope of this study. Development of a preferred system for implementation in each service area is more appropriately done by the responsible municipal authorities who can take into account site-specific issues and their specific circumstances.

Net Effects Evaluation

Based on the Cost, Municipal Finance, Natural Environment, Service and Social Environment Criteria Groups, net effects were determined for each of the alternative 3Rs systems.

The net effects analysis of 3Rs components was not specific to regional conditions, rather it generically developed the effects and mitigation associated with the components of each system in the context of the larger GTA.

The components and their net effects were then recombined into regionally based 3Rs systems to create the net effects analysis for each residential 3Rs system for each Region. For the IC&I system, the net effects analysis remained at the GTA level. The net effects generated were then used to identify advantages and disadvantages to the environment, and comparatively rank the 3Rs systems within each criteria group. Tables 9.1 to 9.5 summarizes the 3Rs system rankings.

TABLE 9.1
DURHAM 3RS SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups				
		Cost	Municipal Finance	Natural Environment	Service	Social
1	Existing	1	1	1	4	5
2	Existing/Committed	1	4	1	4	4
3	Direct Cost	1	A 1 B 1	4	3	1
4	Expanded Blue Box	1	5	3	1	1
5	Wet/Dry	1	6	5	2	3
6A	Mixed Waste Processing (low quality compost)	7	8	6	4	5
6B	Mixed Waste Processing (high quality compost)	6	7	6	4	5

Note: "1" represents highest ranking (low impact).

TABLE 9.2
METRO TORONTO 3RS SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups: Cost		Municipal Finance		Natural Environment	Service	Social
1	Existing		1		1	1	5	5
2	Existing/Committed		1		2	2	4	2
3	Direct Cost		1	A	3	5	2	2
				B	3			
4	Expanded Blue Box		1		3	2	1	1
5	Wet/Dry	A	6		6	4	3	4
		B	1					
6A	Mixed Waste Processing (low quality compost)		6		8	6	6	6
6B	Mixed Waste Processing (high quality compost)		6		7	6	6	6

Note: "1" represents highest ranking (low impact).

TABLE 9.3
YORK REGION 3RS SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups: Cost		Municipal Finance		Natural Environment	Service	Social
1	Existing		1		1	1	5	5
2	Existing/Committed		1		2	2	4	4
3	Direct Cost		1	A	2	5	2	2
				B	4			
4	Expanded Blue Box		1		4	2	1	1
5	Wet/Dry	A	6		6	4	3	3
		B	1					
6A	Mixed Waste Processing (low quality compost)		6		7	6	6	5
6B	Mixed Waste Processing (high quality compost)		6		7	6	6	5

Note: "1" represents highest ranking (low impact).

TABLE 9.4
PEEL REGION 3RS SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups				
		Cost	**Municipal Finance**	**Natural Environment**	**Service**	**Social**
1	Existing	1	1	1	4	4
2	Existing/Committed	1	2	2	3	3
3	Direct Cost	1	2	3	2	2
4	Expanded Blue Box	1	2	2	1	1
5	Wet/Dry	1	2	4	3	3
6A	Mixed Waste Processing (low quality compost)	6	7	5	5	5
6B	Mixed Waste Processing (high quality compost)	6	8	5	5	5

Note: "1" represents highest ranking (low impact).

TABLE 9.5
IC&I 3RS SYSTEM RANKINGS BY CRITERIA GROUP

Systems		Criteria Groups				
		Cost	**Municipal Finance**	**Natural Environment**	**Service**	**Social**
1	Existing	1	1	1	5	2
2	Existing/Committed	1	1	1	3	1
3	Extended 3Rs Regulations	1	1	3	1	2
4	Expanded 3Rs Regulations	1	1	3	2	2
5	Expanded 3Rs Regulations with Organics	1	1	5	3	5
6	Processing All IC&I Waste	1	1	5	6	6

Note: "1" represents highest ranking (low impact).

9.2 Waste Diversion Estimates

This document provides written estimates on the amount of waste that will not be generated due to waste reduction efforts and the amount of waste which will be diverted from disposal due to reuse or recycling efforts.

The disposal requirements for each service area depend on which residential and IC&I systems are combined to form any waste diversion system. The residential and IC&I 3Rs systems can be combined 25 different ways for each service area.[1] The following summarizes the estimated cumulative tonnes (for the 20-year period 1996-2015) of waste that could be diverted through reduction and reuse/recycling and the cumulative diversion rate (expressed as a percentage of total waste generated) by service area.

It should be noted that the diversion percentages discussed in this section are the cumulative diversion achieved over a 20-year period, from 1996 to 2015. These are different from the values presented in the Summary Net Effects Tables presented in Chapter 8, which show a one-year "snap shot" of the diversion that could be achieved by any of the residential systems at a Regional level and the IC&I systems at the GTA level in the year 2000, assuming that the system in question is fully operational in the year 2000.

Durham Region

The study has shown that each of the combined Durham Region systems could result in a source reduction of 0.9 million tonnes representing a 9% diversion rate. Through reuse and recycling efforts, 3.1 million to 7.3 million tonnes could reasonably be diverted. This translates to 32% to 74% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for Durham Region could divert a range of 4 million to 8.2 million tonnes of wastes, or 41% to 83% of the waste stream.

Metro Toronto

The study has shown that each of the combined Metro Toronto 3Rs systems could result in a source reduction of 5.6 million tonnes representing a 9% diversion rate. Through

1 The residential and IC&I Existing systems have not been combined with other systems as both the residential and IC&I Existing/Committed systems will be in place by 1996.

reuse and recycling efforts, 17.1 million to 42.7 million tonnes is estimated to be diverted. This translates to 29% to 72% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for Metro Toronto could reasonably divert a range of 22.8 million to 48.3 million tonnes of waste or 38% to 81% of the waste stream.

York Region

The study has shown that each of the combined York Region 3Rs systems could result in a reduction of 1.7 million tonnes representing a 9% diversion rate. Through reuse and recycling efforts, 5.9 million to 13.5 million tonnes is estimated to be diverted. This translates to 33% to 74% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for York Region could reasonably divert a range of 7.6 million to 15.1 million tonnes of waste or 42% to 83% of the waste stream.

Metro Toronto/York Region

The study has shown that each of the combined Metro Toronto/York Region systems could result in a source reduction of 7.3 million tonnes representing a 9% diversion rate. Through reuse and recycling efforts, 23.1 million to 56.1 million tonnes is estimated to be diverted. This translates to 30% to 72% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for Metro Toronto/York Region could reasonably divert a range of 30.4 million to 63.4 million tonnes of waste or 39% to 82% of the waste stream.

Peel Region

It is expected that each of the combined Peel Region 3Rs systems will result in a reduction of 2.0 million tonnes representing a 8% diversion rate. Through reuse and recycling efforts, 7.4 million to 17.6 million tonnes is estimated to be diverted. This translates to 31% to 74% of the waste stream. When reduction and reuse/recycling efforts are combined, the 25 combinations of residential and IC&I systems for Peel Region could reasonably divert a range of 9.4 million to 19.6 million tonnes of waste or 40% to 82% of the waste stream.

Diversion Estimate Conclusions

The estimates of waste diversion for the three service areas show that of the 25 options considered, 21 have the ability to divert 50% or more of the generated waste stream in the 20-year period between 1996 and 2015.

The analysis shows that the written estimates provided by the MOEE to the IWA in May 1992 fall within the range of diversion achievable by a number of combinations of residential and IC&I systems within each of the service areas.

The systems presented and evaluated were not designed as plans for any of the Regions or service areas. They were chosen to estimate the impacts of a number of different possible approaches to waste diversion. They are not considered a complete list of all the possible combinations of components which could form waste diversion systems, and a comprehensive mix and match of components has not been attempted. The systems were chosen to provide a reasonable range of diversion options, and to estimate the impacts of these options.

9.3 Next Steps

The production of this draft documentation concludes the first phase of the GTA 3Rs Analysis work. Over the next few months, a number of key activities will be taking place including:

- public and agency (including municipal) consultation focusing on the review of the draft documentation;
- verification of data used in the analysis;
- refinement of the draft documentation based on comments received through the consultation program and data verification activities; and
- the submission of final reports to IWA for incorporation in its EAs.

LIST OF ACRONYMS

LIST OF ACRONYMS

3Rs	Reduce, reuse, recycle
AIMI	Analytic Information Management Inc.
BFI	Browning-Ferris Industries
C&D	Construction and Demolition
CFC	Chloroflorocarbons
CMA	Census Metropolitan Area
CMHC	Canada Mortgage and Housing Corporation
CPRA	Canadian Polystyrene Recycling Association
D&B	Dunn & Bradstreet
EA	Environmental Assessment
EA Act	Environmental Assessment Act, 1990
EA Process	Environmental Assessment Process
EYC	Environmental Youth Corps
GATT	General Agreements on Tariffs and Trade
GPMC	Grocery Products Manufacturers of Canada
GTA	Greater Toronto Area
GTCC	Greater Toronto Co-ordinating Committee
HDPE	High-Density Polyethylene
HHW	Household Hazardous Waste
IC&I	Industrial, Commercial and Institutional
IFO	Industry Funding Organization
IWA	Interim Waste Authority
LDPE	Low-Density Polyethylene
MARS	Municipal Archive Retrieval System
MOEE	Ministry of Environment and Energy
MRF	Material Recovery Facility

NAFTA	North American Free Trade Agreement
NAPP	National Packaging Protocol
NIC	Newly Industrialized Country
OCC	Old Corrugated Cardboard
OMG	Old Magazines and Catalogues
OMMRI	Ontario Multi Media Recycling Inc.
ONP	Old Newspapers
OWE	Ontario Waste Exchange
OWMA	Ontario Waste Management Association
PET	Polyethylene Terephthalate
PP	Polypropylene
PRRI	Peel Resource Recovery Incorporated
PS	Polystyrene
PJC	Polyvinyl Chloride
RCN	Regional Consultation Network
RCO	Recycling Council of Ontario
RCRA	U.S. Resource Conservation and Recovery Act
RDF	Refuse Derived Fuel
SIC	Standard Industrial Classification
SWEAP	Solid Waste Environmental Assessment Plan
SWISC	Solid Waste Interim Steering Committee
TTC	Toronto Transit Commission
TWR	Thermal Waste Reduction
WCI	Wood Conversions Inc.
WMI	Waste Management Inc.

GLOSSARY OF TERMS

GLOSSARY OF TERMS

3Rs OF WASTE MANAGEMENT	A hierarchy of waste diversion in the following order: 1) Reduce; 2) Reuse; and 3) Recycle.
ALTERNATIVE TO	"Alternatives to" the undertaking (proposed project) are of a functionally different nature than the undertaking.
ANAEROBIC	The biological state of living and growing in the absence of oxygen without the presence of oxygen.
BLUE BOX	A blue plastic box used by residents of many municipalities and rural areas to collect and store recyclable items and to carry these items to the curbside/ roadside for collection.
CENTRALIZED COMPOSTING	The collection and processing of large quantities of organic waste at a central facility to produce compost/ humus; may be in-vessel (closed container), windrow (open air), or other technologies.
CERTIFICATE OF APPROVAL (C of A)	A license or permit issued by the MOEE for the operation of any waste management facility under the *Environmental Protection Act* (also known as a Provisional Certificate of Approval). Issued to the owner of the site with conditions of compliance stated therein.
COMPOSTING	The controlled microbiological decomposition of the organic fraction of solid waste material resulting in a humus-like end-product which is primarily used for soil conditioning.

CURBSIDE RECYCLING	A recycling program in which people separate recyclable materials from general waste and place them at the curbside/roadside for collection.
DEPOT RECYCLING	A facility, large or small, for the temporary storage of recyclable materials; in some areas, used as drop-off locations by the public; in other areas, used only by municipalities to store materials collected by trucks.
DO NOTHING	The "do nothing" alternative considers what the environment would be like if no action were taken. The "do nothing" alternative serves as a benchmark against which all the alternatives are evaluated and discussed.
EA DOCUMENT (S)	Refers to the document(s) which describe the carrying out of that process resulting in the selection of the preferred alternative and addresses the content requirements of subsection 5(3), EA Act.
ENVIRONMENT	The definition of "environment" in the *Environmental Assessment Act*, which includes the technical, natural, social, economic, and cultural factors, and their interrelationships.
ENVIRONMENTAL ASSESSMENT ACT (EA ACT)	*Environmental Assessment Act*, RSO, 1990. One of the primary acts of legislation intended to protect, conserve and wisely manage Ontario's environment through regulating planning and developing.

EVALUATION	The process of determining the suitability of two or more alternatives on the basis of a common method of comparison.
EVALUATION CRITERIA	A set of broad factors (covering the natural, social, economic, financial, cultural, technical and land-use planning environments) used to determine the suitability of two or more waste management system alternatives and facility/site alternatives on the basis of common method of comparison.
GASIFICATION PLANTS	The processing of waste in a centralized facility for the production of a combustible gas.
GERMAN GREEN DOT SYSTEM	Marking of products to indicate that it will be collected and recycled back into another product by the manufacturer(s).
HOUSEHOLD HAZARDOUS WASTE (HHW)	Substances for household use that are labelled corrosive, flammable, poison, or explosive and should be disposed of properly (not in a landfill site) e.g., paints and batteries.
IC&I WASTE (Industrial, Commercial & Institutional Waste)	Solid waste generated by industries and businesses of all types, including shopping stores, restaurants, hotel/motel establishments, and offices; institutional types of establishments such as schools, hospitals, government offices, and universities. IC&I waste makes up about 60% of Ontario's total municipal solid waste stream.
IGLOOS/DOMES	Collection depot for recyclable materials.
IN-VESSEL	A method of composting in which the compost is mechanically mixed and aerated in a container or enclosed building.

MATERIALS RECOVERY FACILITY (MRF)	A facility where specified materials are intentionally removed from mixed waste or where co-mingled recyclable materials are sorted into distinct categories.
MITIGATION	Techniques for preventing, avoiding or reducing the impact of an environmental problem, such as water pollution caused by the movement of leachate from a landfill site.
MUNICIPAL SOLID WASTE (MSW)	More commonly referred to as garbage, this waste material is handled by municipal collection and/or disposal services. It includes two main types of solid waste: residential (domestic) waste, and industrial, commercial and institutional (IC&I) waste. MSW does not include hazardous and liquid industrial wastes. (See also Residential Waste).
NET EFFECTS ANALYSIS	The residual environmental effects remaining following the consideration of mitigative and enhancement measures of potential effects.
ON-SITE	Areas within which features will be displaced or lost by property purchase and facility development.
RECYCLABLE MATERIAL	A material that is used in place of a primary, raw, or virgin material in manufacturing a product and consists of materials derived from post consumer waste, industrial scrap, and material derived from agricultural wastes and other items, all of which can be used in the manufacture of new products.
RECYCLING	The sorting, collecting and processing of a waste material or product so it can be used for a similar or new purpose. For example, the "Blue Box" system, in-plant scrap handling, or raw material recover systems. Recycling is also the marketing of products made from

	recycled or recyclable materials. This is the third of the 3Rs.
RECYCLING DEPOT	A facility used for the temporary storage of recyclable materials; in some areas, used as drop-off locations by the public; in other areas, used only by municipalities to store materials collected by trucks.
RECYCLING FACILITY OR PLANT	A facility where recycling of used or waste products is carried out.
REDUCE	To decrease. See 3Rs of Waste Management.
REDUCTION	The avoidance or prevention of waste production through measures or efforts designed to reduce the quantities of waste requiring disposal. A reduction in the quantity of waste produced is achieved through modified consumer practices and changes in industrial production to generate fewer useless by-products. The minimization and prevention of waste through changes in lifestyle habits, product design, procedures, purchasing decisions, etc., the first priority of the 3Rs.
REFUSE	See *Waste*.
REFUSE DERIVED FUEL (RDF)	Refers to any usable fuel produced by mechanically, thermally, chemically, or biologically processing solid waste. Typically, RDF is uniform in size and from which glass, metals, ceramics and other non-combustible materials have usually been removed.

RESIDENTIAL WASTE	Waste produced by all types of households, including detached dwellings, row housing, condominiums and apartments. In Ontario, residential waste makes up about 40 per cent of the total municipal solid waste stream.
REUSABLE PRODUCT	Something which can be used again for the same, similar or different purpose.
REUSE	The return of a product or material to use either by reusing it for its original purpose or by finding a new use for it without modifying it. (See 3Rs of Waste Management). This is the second "R" of the 3Rs.
SCAT MACHINE	Is a brand of windrow turner used in centralized composting operations to turn over and/or move the compost to assist in the composting process.
SCREENING	Elimination of alternatives which do not meet the requirements of specific criteria.
SOLID WASTE	Non-hazardous, unwanted, discarded material.
SOURCE REDUCTION	Reducing the amount of materials entering the waste stream by voluntary or mandatory programs to eliminate the generation of waste. The reduction of waste at point of generation (e.g., a product in bulk containers instead of individual packaging).
SOURCE SEPARATION	The separation of specific materials from the waste stream at their point of generation for the purposes of reuse, recycling or further processing.
STAKEHOLDER	A stakeholder is defined as any resident, industry or institution in the GTA or any government agency which could be affected by the GTA 3Rs systems.
STUDY AREA	The geographic area within the GTA.

THREE STREAM COLLECTION	Refers to a waste collection system where waste is separated at source into wet compostables (yard and possibly food waste), dry recyclable (blue box materials) and waste. The remaining solid waste which is landfilled.
TIPPING FEE	The amount of money charged by the operator of an approved waste management facility for receiving and managing waste. The charge is based on either the weight or volume of the waste. The cost is calculated as a percentage of or equal to the total cost (capital and operating) of the facility.
TOXIC TAXI	Refers to a vehicle used for the collection of HHW from households who request the collection of these wastes.
TUB GRINDER	Used in a centralized composting operations, a tub grinder is used to shear the waste material to assist the composting process.
TROMMEL SCREEN	Used in centralized composting operations, a trommel screen is a large horizontal cylinder which rotates the compost to sort the size of material in the finished compost.
TWO STREAM COLLECTION/ WET DRY PROGRAM	A waste collection system where waste is separated at source into wet compostables and the remainder which is then sorted for recyclable materials at a Materials Recovery Facility (MRF).
VERMI-COMPOSTING	Compost unit which requires worms to aid in the composting process or organics.
WASTE	Ashes, garbage, refuse, domestic waste, industrial waste, or municipal refuse and other used products as are designated or interpreted by the provisions of the *Environmental Protection Act* (see Garbage.)

WASTE AUDIT	A study of the generation and management of waste, not including liquid industrial waste or hazardous waste.
WASTE MANAGEMENT SYSTEM COMPONENTS	Alternative waste management technologies and/or processes which includes but are not limited to: · reduction/reuse activities; · at-source separation; · mechanized material separation; · transfer stations; · composting; and · landfilling.
WASTE REDUCTION ACTION PLAN (WRAP)	A plan which was announced by the Minister of the Environment on February 21, 1991 containing specific activities aimed at ensuring that Ontario accomplishes its goal of diverting 25 per cent of waste by 1992 and 50 per cent by the year 2000.
WASTE REDUCTION OFFICE (WRO)	Created in February 1991 within the Ministry of the Environment to oversee implementation of Ontario's Waste Reduction Action Plan and other waste reduction initiatives province wide.
WASTE STREAM	The waste generated by a specific source (e.g. residential or IC&I).
WET/DRY RECYCLING	See Two-Stream Recycling
WINDROW	A long row of heaped material left on the ground in a controlled area. In composting, waste material is sometimes made into windrows so that the materials can be easily turned over.

APPENDIX A

MOEE Minister's May 15, 1992 Letter

Ministry of the Environment
Ministère de l'Environnement
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May 15, 1992

Ms. Jan Rush, Chair
Interim Waste Authority,
20 Bay Street, Suite 1625,
Toronto, Ontario.
M5J 2N8

Dear Ms. Rush:

In accordance with section 14 of the Waste Management Act, 1992, shown below are estimates of the cumulative amounts of waste that will be diverted from disposal over the period 1996 to 2015 due to waste reduction, and reuse and recycling. All numbers are in millions of tonnes.

Waste Diversion Estimate

	Reduction	Reuse & Recycling
Metropolitan Toronto and York Region	18.7	18.1
Peel Region	5.2	6.2
Durham Region	2.6	3.9

Yours sincerely,

Ruth Grier

Ruth Grier
Minister

APPENDIX B

Public Consultation Materials for Stage 1

ONTARIO WASTE REDUCTION OFFICE

PUBLIC CONSULTATION ON WASTE DIVERSION ESTIMATES PROVIDED TO THE INTERIM WASTE AUTHORITY

TABLE OF CONTENTS

A. Introduction

This report describes a public information program conducted during the summer of 1992 on behalf of the Waste Reduction Office (WRO) of the Ontario Ministry of the Environment.

In compliance with Section 14 of the *Waste Management Act, 1992* (see Appendix B), estimates of the quantities of waste that will be diverted from disposal over the period 1996 to 2015 due to waste reduction; and reuse and recycling, were given to the Interim Waste Authority (IWA) by the Minister of the Environment in May 1992 (see Appendix A). The intent of the public information program was to ensure that the public was aware of the estimates used by the IWA, and to encourage public discussion about waste diversion initiatives.

There also was information available about the role of the Waste Reduction Office in achieving the Province's waste diversion targets (*at least* 25% by the end of 1992 and *at least* 50% by the year 2000); and about measures the provincial government is undertaking to accelerate 3Rs activity around the province and particulary within the GTA (see Appendix B).

B. Outline of Program

The program was initiated when the IWA announced its Long List of Candidate Sites (EA Document II, Part two) on June 4, 1992. WRO displays and information materials were placed at each of the eight Community Information Centres (CIC) operated by the IWA throughout the Regions. WRO staff and/or consultants visited the CICs regularly throughout the review period, answering questions and ensuring sufficient information-materials were available with respect to the diversion estimates.

C. Materials Available at the Community Information Centres

The following materials were available at the Community Information Centres. These documents are included in Appendix B.

i. Waste Diversion Estimates for the Greater Toronto Area (GTA)
ii. The Role of the Waste Reduction Office in the Greater Toronto Area
iii. Ontario's Waste Reduction Targets
iv. The Ban on New Garbage Incinerators in Ontario
v. Why Three Landfill Sites in the Greater Toronto Area
vi. Why Not Ship Metropolitan Toronto's Garbage Some Place Else?
vii. *Waste Management Act, 1992* (Bill 143)
viii. Waste Reduction Office Initiatives Paper #4 - Measuring Progress Towards Ontario's Waste Reduction Targets
ix. The Road to a Conserver Society (June 17, 1991)
x. The Waste Crisis in the Greater Toronto Area - A Provincial Strategy for Action

Each Community Information Centre displayed comment sheets soliciting public input regarding the diversion estimates. Two comments were received. One inquired about what was being done with scrap tires and advocated consideration of tire derived fuel as proposed by a cement company. The other expressed concern that new landfills should not be considered when advancing technology has made incineration a more acceptable alternative.

D. Information Sessions

Information Sessions to discuss waste diversion and the estimates were held in Sutton, Stouffville and Snelgrove. These sessions were attended by members of the public who were contacted by telephone after having expressed an interest on sign-up sheets posted at each of the IWA's Community Information Centres.

Twenty-four (24) people participated in the Information Sessions. Many more had signed up and then decided, once they were given more information over the telephone, that the sessions were not of interest to them. Although sign up sheets were posted at all the Centres, there was no interest expressed in having information sessions at the other four CICs.

Another Information Session was scheduled for King City but turned into an informal discussion when only one participant showed up.

E. Summary of Participant's Comments

The following summarizes participant comments and questions from the Information Sessions.

1. General frustration with the siting process

Many participants arrived at these sessions with a high degree of suspicion regarding the siting process being undertaken by the Interim Waste Authority. This sentiment coloured their general approach to provincial government initiatives in the waste management area, including the 3Rs.

2. **Landfilling is not seen as the solution**

Most participants felt strongly that a more aggressive diversion solution should be developed, one that would make landfilling unnecessary. Also, several participants objected to the governments decision not to have the IWA include incineration and long-haul transport options in its Environmental Assessments. In York Region, participants strongly expressed their opposition to the size of the proposed site. They argued that the size of the site was too big for the needs of the Region, and that it should not be sized to accept Metro Toronto's garbage.

3. **3Rs activities and diversion efforts need more public resources**

Concerns were raised at each of the meetings about the financial commitment to siting landfills. This commitment was perceived as much greater than the financial commitment to the 3Rs.

It was suggested that government's should provide industry with incentives to develop 3Rs; particularly in developing markets for secondary materials.

4. **Concerns with the overall authority for waste management**

Some participants felt the *Waste Management Act, 1992* gave too much authority to the Regional Municipalities, while others felt it gave the provincial government permission to be autocratic.

Some were uneasy that any diversion initiatives put in place by the present government could be overturned by its successors. These participants feared this would cause difficulties for industries that had 're-tooled'. They also felt that the communities hosting landfills would then be forced to accept materials for which the site had not been designed. There was also a concern that this would mean increased truck traffic.

Some participants felt the provincial government should force communities (and individuals) to recycle and reduce, through user pay systems, mandatory source separation, and stiffer penalties.

F. Regional Consultation Networks (RCNs)

In addition to the Information Sessions, WRO staff also made presentations on the diversion estimates and diversion initiatives to the Regional Consultation Networks (multi-stakeholder committees which have been meeting monthly throughout the IWA process).

Some participants at the RCN meetings strongly expressed their frustration that not enough was being done to seriously address the large quantities of waste being generated. They also expressed that more needed to be done to enhance diversion. Some also reiterated concerns about the exclusion of incineration and long-haul transport of waste as possible solutions.

G. Conclusions

This program attempted to satisfy both the need to disseminate information relating to the estimates given by the Minister of the Environment to the IWA; and to encourage public discussion about the estimates and about diversion initiatives within the communities affected by the IWA landfill site search.

1. Public interest and participation in the program was very modest.

2. Participants were more interested in discussing the IWA's search process than in discussing the estimates or the estimating procedure.

3. Interest was primarily focused on the large waste volumes currently going to landfill; and on ways to reduce local disposal of these volumes.

4. Participants made clear their concern that diversion activities should not be overshadowed by the siting of landfills.

5. Many expressed the opinion that governments - both local and provincial - should be placing a much higher priority on alternatives to local landfills.

Developing public interest in the details of diversion - such as what should be diverted first and why, developing markets - is an on-going process of information sharing and dialogue. This program was only a first step to initiate that dialogue, and subsequent efforts will engage stakeholders in a more detailed review of diversion alternatives for the GTA.

APPENDIX A

Minister's Letter to the Interim Waste Authority, May 15, 1992

Ministry of the Environment
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May 15, 1992

Ms. Jan Rush, Chair
Interim Waste Authority,
20 Bay Street, Suite 1625,
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Dear Ms. Rush:

In accordance with section 14 of the Waste Management Act, 1992, shown below are estimates of the cumulative amounts of waste that will be diverted from disposal over the period 1996 to 2015 due to waste reduction, and reuse and recycling. All numbers are in millions of tonnes.

Waste Diversion Estimate

	Reduction	Reuse & Recycling
Metropolitan Toronto and York Region	18.7	18.1
Peel Region	5.2	6.2
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Yours sincerely,

Ruth Grier

Ruth Grier
Minister

APPENDIX B

Materials Available at CICs

Ministry of the Environment
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JUNE 1992

QUICK FACTS

WASTE DIVERSION ESTIMATES FOR THE GREATER TORONTO AREA (GTA)

Section 14 of the ***Waste Management Act, 1992,*** requires that the Ministry of the Environment provide the Interim Waste Authority (IWA) with written estimates of the amount of waste generated in the GTA expected to be diverted from disposal over a twenty-year period (1996 to 2015).

In May 1992, the Minister of the Environment provided these estimates to the IWA. The estimates are to be used by the IWA in planning for landfill capacity in the three GTA primary service areas of (1) Durham Region, (2) Peel Region and (3) Metropolitan Toronto and York Region.

The estimates were derived by the Ministry's Waste Reduction Office (WRO), based on the assumptions that population in the GTA will grow as forecast by regional municipal planners, and that the Province's waste diversion targets of at least 25 per cent by 1992 and at least 50 per cent by 2000 will be achieved. It was also assumed that the per capita amount of diversion will level off after the year 2000.

Waste tonnages that otherwise would be generated if diversion were not increased relative to 1987 were calculated based on the actual tonnes per capita disposed of in 1987. The year 1987 is used as a planning base by the Ministry and by several municipalities.

The WRO's estimates are divided into the amount of waste that may be diverted through reduction, and the remainder that would then be diverted through reuse and recycling. The method for deriving the estimates is explained in the Ministry's technical report entitled **Waste Diversion Estimating Method for the Greater Toronto Area**. The cumulative estimates for the twenty-year period are provided below in millions of tonnes.

	Reduction	Reuse and Recycle
Metropolitan Toronto and York Region	18.7	18.1
Peel Region	5.2	6.2
Durham Region	2.6	3.9

Later this year, the WRO will initiate a public consultation process to assist in developing a waste diversion strategy designed to achieve at least the estimated levels of reduction, reuse and recycling in the GTA. The means for achieving waste diversion on this scale will be the primary focus of this consultation.

For more information on waste issues contact:

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Telephone: (416) 323-4321
1-800-565-4923

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JUNE 1992

QUICK FACTS

THE ROLE OF THE WASTE REDUCTION OFFICE IN THE GREATER TORONTO AREA

The mandate of the Waste Reduction Office (WRO) is to help move Ontario from a society which consumes and disposes, to one that conserves resources through the reduction, re-use, and recycling of valuable materials which have traditionally been considered "waste". To achieve this, the WRO is working cooperatively with stakeholders across the province to strengthen policies and programs that maximize diversion from disposal of those "secondary" - but still valuable - materials.

Charged with coordinating the implementation of the Waste Reduction Action Plan (WRAP) announced in February of 1991, WRO efforts are focussed on encouraging source reduction, exploring new opportunities for re-use, and stimulating markets for recyclables.

As part of its responsibilities to maximize diversion from disposal, the WRO is coordinating the development and implementation of a 3Rs (reduction, re-use, and recycling) strategy for the Greater Toronto Area, that will achieve the provincially set targets of at least a 25 per cent reduction of waste requiring disposal by 1992 and at least a 50 per cent reduction by the year 2000.

At this time the landfill planning process for the GTA, being undertaken by the Interim Waste Authority (IWA), requires estimates of what level of diversion will be achieved throughout the life of the sites (1996 to 2015). Under the Waste Management Act of 1992, the Ministry of the Environment is resposible for providing these estimates. Information on the calculation methods used by the WRO to arrive at the estimates can be found on the information sheet **Waste Diversion Estimates for the Greater Toronto Area (GTA).**

Later this year the WRO will also be providing to the IWA information on the effects 3Rs activity, such as composting in the GTA, may have on the composition of the waste requiring disposal.

During the fall of 1992, the WRO will be initiating a public consultation process to assist in further developing the diversion strategy for the GTA that will - at a minimum - meet the provincial waste reduction targets.

For more information on waste issues contact:

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JUNE 1992

QUICK FACTS

ONTARIO'S WASTE REDUCTION TARGETS

The Ontario Minister of the Environment has established two targets for waste to be diverted from disposal: A reduction of at least 25 per cent by 1992, and a reduction of at least 50 per cent by the year 2000 from 1987 rates. These targets apply to non-hazardous solid waste requiring disposal either at sanitary landfills or existing incinerators.

To achieve these targets, the province has initiated a series of diversion initiatives to reduce Ontario's dependence on disposal facilities. Data from operators of municipal and private waste management facilities will be collected, as will information about successful diversion initiatives, to assist in the development of waste management system plans. The information will also help to determine the level of investment required for programs to enhance diversion, such as market development, waste exchanges, and other initiatives.

Progress in reaching the targets will be measured by comparing amounts of waste requiring disposal in each year, with the amount disposed of in 1987. Population changes after 1987 will be taken into account to arrive at a **Per Capita Diversion Rate**. In addition to identifying province-wide success in reaching the target, municipalities and waste management system planners will find this data useful in evaluating local progress at waste diversion.

For further information on the provincial waste diversion targets, please refer to WRO Initiatives Paper No.4: **Measuring Progress on Ontario's Waste Reduction Targets.**

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Ministry of the Environment
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JUIN 1992

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EN BREF...

LES OBJECTIFS DE L'ONTARIO EN MATIÈRE DE RÉDUCTION DES DÉCHETS

Le ministère de l'Environnement de l'Ontario a établi deux objectifs en matière de réduction des déchets, soit la réduction d'au moins 25 p. 100 des déchets normalement destinés à l'enfouissement, en 1992, et d'au moins 50 p. 100, d'ici l'an 2000. Ces objectifs s'appliquent aux déchets solides non dangereux destinés à être éliminés dans les lieux d'enfouissement ou dans les incinérateurs existants.

Pour atteindre ces deux objectifs, la province a instauré une série d'initiatives de réacheminement des déchets afin de réduire la dépendance de l'Ontario à l'endroit des installations d'élimination des déchets. Des données provenant des exploitants d'installations municipales et privées de gestion des déchets ainsi que des informations sur les initiatives de réacheminement des déchets couronnées de succès seront compilées pour faciliter l'élaboration de systèmes de gestion des déchets. Ces données serviront également à déterminer le montant des investissements nécessaires pour la création de programmes destinés à mettre en valeur le réacheminement des déchets, tels que l'exploitation des marchés, l'échange des déchets et autres initiatives.

Les progrès réalisés seront mesurés chaque année en comparant les quantités de déchets à éliminer par rapport aux chiffres de 1987. Les variations démographiques seront prises en compte dans la détermination du « taux de réacheminement des déchets par habitant ». En plus de permettre de mesurer les progrès par rapport aux objectifs provinciaux, ces données serviront aux municipalités et aux planificateurs de systèmes de gestion des déchets à évaluer les progrès réalisés à l'échelle locale.

Prière de consulter le document de travail n° 4 du Bureau de gestion de la réduction des déchets, intitulé *Mesure des progrès de l'Ontario en matière de réduction des déchets*, pour en savoir plus long sur les objectifs provinciaux en matière de réacheminement des déchets.

Pour obtenir de plus amples renseignements sur la gestion des déchets, s'adresser à :

Environnement Ontario
Centre d'information
135, avenue St. Clair ouest
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QUICK FACTS

Fall 1992

THE BAN ON NEW GARBAGE INCINERATORS IN ONTARIO

INCINERATOR BAN:

In April 1991, the Minister of the Environment, Ruth Grier, banned the construction of new garbage incinerators in Ontario. In September 1992, the ban was given legal force by an amendment to Regulation 347 (formerly Regulation 309) under the *Environmental Protection Act*.

The ban does not affect Ontario's five existing garbage incinerators. Every year about 400,000 tonnes of Ontario's garbage are burned in large incinerators. That's nearly 4 per cent of all solid waste from residential, commercial, industrial and institutional sources combined. However, the Certificates of Approval and monitoring requirements for these facilities are being reviewed by the environment ministry to determine where they need to be upgraded. In additon to outlawing new incinerators, the Regulation defines permissible uses of incinerators for waste streams which may be hazardous or have no viable recycling potential. These include several types of sludges, animal and pathological wastes, forestry plant wastes and wood waste. As well, apartment incinerators were phased out in 1989.

The ban on garbage incineration is based on a careful consideration of the overall environmental and economic impact of the technology. It is in keeping with the Ontario government's emphasis on pollution prevention and waste reduction as the primary means of protecting the environment.

HEALTH AND ENVIRONMENTAL IMPACT:

Even with the best emission controls, all incinerators cause air pollution. The pollutants vary according to the type of garbage burned. They can include nitrogen oxide, sulphur dioxide, hydrogen chloride, metals and organic pollutants such as dioxins and furans. Some of these pollutants contribute to global warming. Many of them are toxic. Eventually they settle in soil and water, adding to the cumulative toxic load on the environment, which can then have a detrimental impact on human health.

Moreover, incineration does not make the garbage disappear. Incineration simply reduces the amount of waste by about two-thirds. The residual bottom ash still requires disposal in landfill sites. As well, fly ash captured in the smoke stack is extremely toxic and has to be disposed of as hazardous waste at a high cost in specially designed landfill sites.

COST AND INEFFICIENCY:

Garbage incinerators are extremely expensive to build. For example, an incinerator to burn only a quarter of the solid waste from the Greater Toronto Area would cost almost a billion dollars. Operating costs for incinerators are also very high. These costs typically exceed the potential savings from the recovery of energy for heating or electrical power.

There is no cost advantage of garbage incinerators over aggressive 3Rs (reduction, reuse and recycling) programs such as composting, and over the siting, construction and maintenance of landfills. As a result of major financial losses, the world's largest garbage incinerator, located in Detroit, Michigan, has been sold. An incinerator in London, Ontario, is now for sale.

COMPETITION WITH WASTE REDUCTION:

The environment ministry's waste management strategy encourages Ontario's citizens to adopt the principles of a conserver society. Through policies and programs based on the 3Rs, it is promoting far-reaching waste reduction in Ontario's residential, industrial, commercial and institutional sectors. With these programs, the Government of Ontario expects to meet its waste reduction targets of at least 25 per cent in 1992 and at least 50 per cent by the year 2000.

Rather than helping waste reduction efforts, however, incinerators require a constant large supply of garbage - up to 3,000 tonnes per day to be economically viable - even if it means shipping it in from other places. Some of the "waste" burned includes materials that could have been recycled or re-used. This hurts the economic viability of recycling programs such as the Blue Box, and it removes incentives for manufacturers to make products and packaging that are reusable and recyclable.

ECONOMIC RENEWAL:

Given Ontario's current economic situation, building new garbage incinerators will impose unacceptable environmental, social and financial costs on Ontario taxpayers. Also, burning valuable resources causes job losses. Incineration competes with the development of new environmentally responsible technologies and materials that would help Ontario industry in an increasingly competitive global economy. Other countries have already recognized "green industries" as key components of their plans for economic recovery. Ontario is taking similar actions that will lead to a healthier and more environmentally sustainable economy.

For more information on waste issues contact:

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QUICK FACTS

Fall 1992

WHY THREE LANDFILL SITES IN THE GREATER TORONTO AREA?

The Greater Toronto Area (GTA) is running out of landfill space. To ensure that the long-term waste disposal needs of the GTA can be managed, in April 1991, the provincial government established the Interim Waste Authority to select and develop three new landfill sites. These sites will be designed to last at least 20 years.

One site will be located in the Region of Peel; one site in the Region of Durham. Each of these two sites will accept garbage only from the region in which it is located. A single site, however, will serve the combined disposal needs of Metropolitan Toronto and the Region of York. In other words, four out of the five regions within the GTA will be serviced by the three landfill sites. The IWA is not undertaking a site search in Halton Region, because it already has an approved landfill.

Some people have suggested that the entire GTA be serviced by a single "super" landfill site. Others have suggested a greater number of "mini" landfill sites for each region. In determining that the IWA's mandate would be limited to three separate site searches, a sequence of decision-steps was followed.

DISPOSAL SERVICE AREAS:

The geographic area requiring waste disposal services, in general terms, is known as a "waste disposal service area." Is it better to think of the GTA as one large disposal service area, or as a number of smaller areas? In the case of the GTA, the disposal service areas correspond to the areas of the five regional or "upper tier" municipalities. The operation of waste disposal facilities (as different from the collection of waste) is an upper-tier jurisdiction. The "lower tier" or local municipalities do not have responsibility for waste disposal. At most, their responsibility is limited to the collection of waste from homes and businesses.

In effect, the GTA is divided into five waste disposal service areas. However, for the purposes of the IWA landfill site search, the number of disposal service areas under consideration was reduced to four by excluding Halton Region for the reason noted above.

Next, the disposal service areas of Metro Toronto and York Region were combined, thereby reducing the number of disposal service areas to three. The decision to combine the two areas was based on an arrangement between Metro Toronto and York Region. In the arrangement, currently in effect, Metro Toronto agrees to service its own disposal needs as well as those of York Region.

LOCAL RESPONSIBILITY:

As announced by the Minister of the Environment, Ruth Grier, in April 1991, the principle of local responsibility for solid waste was applied in the GTA to mean that the landfill site selection process would be confined to the GTA. No municipal waste from the GTA would be sent to places elsewhere in Ontario. As well, a disposal service area would not handle waste generated from another (except in the case of the combined Metro Toronto/York disposal service area). Thus, the principle of local responsibility effectively eliminated the idea of a "super" landfill site for the entire GTA. These principles were included in legislation introduced to the Ontario Legislature as *The Waste Management Act* (Bill 143) in October 1991. *The Waste Management Act*, 1992 came into effect on April 27, 1992.

There were other arguments against a "super" site. For one thing, a GTA "super" site would need to handle more than 56 million tonnes of garbage over at least 20 years. Finding an environmentally acceptable landfill site of that size would be extremely difficult. Its environmental and social impact on a local community would be significant.

EFFICIENCY:

The alternative of developing only one landfill in each of the three disposal service areas, instead of developing a series of smaller sites in each of the disposal service areas, was decided upon primarily on the basis of efficiency in terms of cost and environmental approvals.

Developing and operating a landfill site is very expensive. Generally, a single landfill site servicing the disposal needs of a number of communities is much more cost-efficient than a series of mini-sites. It reduces the duplication of facilities, staff and operations, as well as the complicated and costly environmental monitoring required at each site. In fact, a group of municipalities sharing a landfill site is common practice, especially if the municipalities are federated into a larger regional municipality as in the GTA.

All landfill sites require approval under provincial environmental assessment legislation. This process, being followed by the IWA, involves documenting very precisely the potential impact of a landfill on the agricultural, ecological, hydrogeological, geological and social features of the area. Doing an environmental assessment for a number of mini-sites for each disposal service area would result in duplication, substantially higher costs, and a significantly longer period of time to obtain approval.

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Fall 1992

WHY NOT SHIP METROPOLITAN TORONTO'S GARBAGE SOME PLACE ELSE?

Finding a place for Metropolitan Toronto's garbage is an important environmental concern. The two landfill sites owned by Metro Toronto - Keele Valley Landfill in York Region, just north of Toronto, and the Brock West Landfill in Durham Region, just east of Toronto - will reach capacity in the next few years.

One suggestion for handling Metro's garbage problem is to ship the waste over long distances to places elsewhere in Ontario. However, most communities beyond the Greater Toronto Area (GTA) oppose the idea. (The GTA includes the Regions of Peel, York, Durham, and Halton, and Metropolitan Toronto). A process for selecting three landfill sites to handle the wastes of the GTA (with the exception of Halton Region, which already has an approved new landfill) is now underway. This site selection process is confined to considering sites only within four out of the five GTA regions which are to be serviced by the new long-term landfill sites.

LOCAL RESPONSIBILITY:

The difficulty with shipping Metro's waste to other places in the province is that it does not solve the garbage problem. It only moves it out of sight. Waste disposal practices which encourage an "out-of-sight, out-of-mind" attitude do not help Ontario's efforts to reduce the amount of waste through the 3Rs - reduction, reuse and recycling. The principle of local responsiblity means that municipal governments, which have the responsibility for waste disposal, must do so within or as close as possible to their own areas of jurisdiction.

The only exception to this general rule which is acceptable is when a municipality must ship its waste to another municipality for a short time as 3Rs programs are being put into place and new landfill sites are getting environmental approvals or being constructed. In this case, transporting waste from one municipality to another is a short-term solution to an emergency.

Until the spring of 1991, municipal councils in the GTA had been seriously entertaining the idea of transporting their garbage to rural southern Ontario and northern Ontario. In April 1991, the Minister of the Environment, Ruth Grier, established the Interim Waste Authority with the mandate of finding three new, long-term landfill sites in the GTA. She stated that in keeping with the principle of local responsibility for waste, the authority will not consider transporting GTA waste outside the GTA. These principles were included in legislation introduced to the Ontario Legislature as *The Waste Management Act* (Bill 143) in October 1991. *The Waste Management Act*, 1992 came into effect on April 27, 1992.

SOCIAL AND ENVIRONMENTAL BENEFITS:

Taking the long view, the proposal has several social and environmental advantages over shipping garbage outside of the GTA:

- It encourages local residents, industries, and other groups to participate in the process of choosing the locations for the landfill sites.

- It sustains public awareness of the great need to reduce the volume of waste generated every day in the GTA.

- It keeps the money earned from the fees charged to industrial users of the landfill sites within the GTA, making it available for investment in local 3Rs programs such as Blue Box recycling and home composting.

- It eliminates the high financial and environmental costs of transporting waste long distances. Such costs may include the environmental effects of greatly increased traffic through small communities as well as the expense of upgrading highways, local roads and railway corridors, and building transfer stations.

- It means that the GTA communities have reliable and uninterrupted access to landfill sites. When shipping waste over a long distance to another jurisdiction, there may be the risk of unanticipated restrictions on access to the landfill site.

Some proposals for transporting garbage to municipalities outside of the GTA include the shipment of recyclables. But it does not make economic sense to pay the cost of shipping recyclable materials to another municipality so they can be sorted and shipped back to the GTA - the biggest market for recyclable materials in Ontario.

Finally, by managing their own waste, municipalities within the GTA will provide a model for other Ontario communities which are now or soon will be facing similar waste problems.

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Waste Reduction Office
Initiatives Paper No. 4

MEASURING PROGRESS TOWARDS ONTARIO'S WASTE REDUCTION TARGETS

REDUCE
REUSE
RECYCLE

Ontario
Environment
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Waste Reduction Office Initiatives Paper Series

PIBS 1708E	Initiatives Paper No. 1: Regulatory Measures to Achieve Ontario's Waste Reduction Targets, October 1991
PIBS 1882E	Initiatives Paper No. 2: Waste Management Planning in Ontario, March 1992
PIBS 1882E-02	Municipal Waste Management Powers: A Discussion Paper, March 1992, Ministry of Municipal Affairs in conjunction with the Ministry of the Environment
PIBS 1954E	Initiatives Paper No. 4: Measuring Progress Towards Ontario's Waste Reduction Targets, June 1992

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EXECUTIVE SUMMARY

This is the fourth in a series of Initiatives Papers discussing topics related to reducing and managing Ontario's wastes. The paper was prepared by the Waste Reduction Office of the Ministry of the Environment, following discussions with municipal, federal, provincial, and private sector waste managers and environmental officials.

Initiatives Paper No. 4 provides guidance for monitoring progress towards achieving the Province's waste reduction targets. It explains the targets, and discusses factors affecting their measurement such as types of materials, units of measure, and monitoring points in the waste management system. It also discusses application of the targets for planning purposes. These topics are all linked to the development of a waste management information system.

The Government of Ontario has established targets to decrease waste going to disposal by at least 25 per cent in 1992 and at least 50 per cent by the year 2000 compared to the base year of 1987. In February, 1991, the Minister of the Environment announced the *Waste Reduction Action Plan*, aimed at accelerating efforts across Ontario to reduce the amount of waste going to disposal. Implementation of the *Waste Reduction Action Plan* through the 3Rs (reduction, reuse, recycling) programs is being coordinated by the Waste Reduction Office, established in 1991 within the Ministry of the Environment. The 3Rs of waste management help to divert recoverable material from disposal to productive uses in the economy.

Ontario's waste reduction targets apply to non-hazardous solid wastes "traditionally" managed by disposal at landfill, dump, and existing incineration facilities. They are expressed relative to the tonnes disposed of in the base year 1987. Various factors, such as flucutations in population, economic growth, and international trade affect the accuracy with which the diversion quantities can be calculated. The Ministry is developing models that take these factors into account when reporting diversion figures.

The targets apply to planning and monitoring progress in the province as a whole. However, both the municipal and the industrial, commercial and institutional (IC&I) sectors expressed interest in planning and monitoring their individual contributions. To satisfy these needs, the Ministry developed two ways to measure progress towards achieving the waste reduction targets for any particular year.

The ***Per Capita Diversion Rate*** is calculated as follows:

$$\frac{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}} - \dfrac{\text{19-- Waste Disposal}}{\text{19-- Population}}}{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}}} \times 100$$

where "Waste Disposal" is measured in tonnes.

The Ministry uses this formula to monitor progress at the provincial level. The formula can also be used by municipalities to monitor their progress in achieving the same provincial targets applied at the municipal level.

The second method is the **Absolute Diversion Rate**, calculated as follows:

$$\frac{\text{1987 Waste Disposal} - \text{19-- Waste Disposal}}{\text{1987 Waste Disposal}} \times 100$$

where "Waste Disposal" is measured in tonnes.

This formula is used to determine the effect of diversion on remaining landfill capacity. Individual IC&I organizations also can use it to determine the success of their internal diversion programs.

The movement of waste and recoverable materials through a waste management system can also be monitored. The waste management system can be viewed as a network of "streams" of waste and recoverable materials beginning at the source of generation, and moving through collection, processing, and disposal. The rate, magnitude and direction of movement are dimensions of the waste management system which may be measured. Different stakeholders have their own monitoring requirements such as the need for identifying efficiency improvements through waste reduction or to help in the sizing of facilities. From the Province's perspective, the monitoring of waste and material streams will help in the implementation of waste diversion initiatives aimed at diminishing the use of disposal facilities. With that goal in mind, municipal and private waste managers will be required by regulations now under consideration to report quantities of waste received at disposal facilities. These reports will provide details about the successes of specific waste diversion initiatives and programs.

Diversion opportunities and priorities will also vary according to the different types of materials involved. The data reported by waste disposal facilities will need to identify the composition of the waste stream received for disposal, in order to indicate the effectiveness of efforts to divert particular classes of material. To ensure that each

disposal facility classifies materials in the same way, the Ministry led a task force of municipal and IC&I representatives in developing a list of "Standard Material Classes." The Province's classification system need not replace the categories now used by municipalities and private waste managers. Rather, it provides a simple way to translate their own information into a common format used across the province. Thus stakeholders can evaluate quantities of materials still available for diversion, and indicate the types of materials recovery facilities or other diversion initiatives still required.

The data reports are part of a waste management information system now being developed by the Ministry. It includes a database to record disposal data, successful diversion initiatives and relevant municipal and facility information. Municipalities will be required to submit periodic data reports to the Ministry. The Ministry is also developing models to estimate disposal for those facilities without weigh scales or estimating techniques.

The data will be used to calculate the provincial diversion rates, assist in creating waste management system plans, and allocate support for market development and waste exchanges.

The Ministry continues to support municipalities and private waste managers by providing technical outreach and funding support programs.

Ontarians, working together, can develop a conserver society, by becoming leaders in developing ways to minimize waste and maximize secondary resource usage.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Purpose

The paper addresses requests from municipal and industrial, commercial and institutional (IC&I) sectors for guidance on monitoring the attainment of the provincial waste diversion targets of at least 25 per cent in 1992 and at least 50 per cent by 2000. The paper provides information which can be applied as follows:

- As a means to evaluate progress in waste reduction against the provincial targets, both at the provincial and municipal levels;
- As a tool for use in planning and sizing waste management and material recovery facilities;
- As guidelines for the private sector to plan initiatives to reduce waste identified in waste audits; and
- As guidelines for the private sector to plan initiatives to reduce packaging wastes.

The Ministry encourages all those involved in waste management activities to use the methods outlined in this document to monitor and measure waste diversion. Adopting standard methods of measurement helps provide a consistent basis for assessing diversion achievements. The methods are an effective tool for the planning of waste management systems and can be used to identify the opportunities for material recovery programs.

1.2 Waste Reduction Office *Initiatives Papers* Series

This publication is the fourth in a series of *Initiatives Papers* describing the provincial government's waste reduction policies, activities and directions. It provides an interpretation of the provincial waste reduction targets, a list of standard material classes, confirms units of measure, explains the application of the targets, and gives an overview of a waste management information system. The paper was prepared by the Waste Reduction Office of the Ministry of the Environment, following discussions with municipal, federal, provincial, and private sector waste managers and environmental officials. Previous publications in the *Initiatives Papers* series include:

Initiatives Paper No. 1: *Regulatory Measures to Achieve Ontario's Waste Reduction Targets,* October 1991

Initiatives Paper No. 2: *Waste Management Planning In Ontario* March 1992.

Municipal Waste Management Powers: A Discussion Paper, issued by the Ministry of Municipal Affairs in conjunction with the Ministry of the Environment, March 1992.

1.3 Ontario's Waste Reduction Targets

The Government of Ontario has established targets to decrease the amount of waste going to disposal by at least 25 per cent in 1992 and at least 50 per cent by the year 2000 compared to the amount of waste disposal for the base year of 1987. The targets are intended to encourage Ontario's move towards a "conserver society" and to manage the province's secondary resources through application of the 3Rs -- reduction, reuse and recycling. Achieving the targets will indicate progress towards these objectives.

Initiatives Paper No. 1 describes the first set of proposed regulatory measures which were part of the *Waste Reduction Action Plan* announced by the Minister of the Environment in February 1991. The measures provide a regulatory foundation for a consistent approach to achieving the province's waste reduction targets. These regulatory measures, expected to be announced by the end of 1992, will address the following issues:

- Preparation of waste audits and implementation of waste reduction workplans by IC&I organizations;
- Establishment and operation of source separation programs by IC&I organizations and municipalities; and
- Simplification of the approvals process for 3Rs facilities.

Monitoring progress relative to the targets will help evaluate the impact of these regulations and identify the need for other 3Rs initiatives.

Initiatives Paper No. 2 describes changes to the current waste management planning program that would introduce an integrated "two stream" planning and approvals process for waste management systems. One planning stream is aimed at establishing a "Waste Diversion System" which can begin implementation even as the second planning and approvals stream is underway for the "Waste Disposal System." The Province's waste reduction targets, if adopted as planning objectives, have significant implications for the sizing and the design of the overall waste management system. Initiatives Paper No. 2 was released for public consultation together with a discussion paper on municipal waste management powers.

1.4 Trends in Disposal and Diversion

Figure 1, "Illustrative Trends in Disposal and Diversion", indicates the significant quantity of materials which must be diverted from disposal if the targets are to be met. The diagram is a simplification of reality, based on gross estimates and projections, developed as an aid to illustrating relationships between some key concepts.

The dashed line represents the amount of waste going to disposal in per capita rates (tonnes/person/year) as a percentage of the 1987 base year. Various waste composition analyses indicate that annual per capita disposal rate continued to increase until 1987. Subsequently, disposal rates have decreased partly as a result of municipal 3Rs programs.

Above the dashed line is a shaded area labelled "Existing Diversion". It represents the unknown per capita rate of used materials which have been absorbed back into the economy through "traditional" 3Rs activities existing long before 1987 and expected to continue into the future. Examples of such activities include scrap metal salvaging, refillable soft drink containers, and second-hand stores.

Without any new diversion activities, however, the dashed line is likely to continue in an upward trend. The solid line, which begins to emerge after 1987, depicts the *maximum* desirable per capita rates of disposal. The area labelled "New Diversion" represents additional 3Rs activities needed to achieve the provincial waste reduction targets. It also represents the future potential of a secondary materials industry as a growing economic sector. The Ministry's funding and support programs are designed to maintain the existing diversion activities while maximizing development of the new diversion activities.

2.0 INTERPRETING THE PROVINCIAL WASTE REDUCTION TARGETS

Ontario's targets state that the amount of solid waste going to disposal must be reduced by at least 25 per cent in 1992 and by at least 50 per cent by the year 2000. The Ministry calculates attainment of the targets at a provincial level and monitors waste diverted from disposal against the 1987 base year.

The targets apply to municipal solid waste, which includes all solid non-hazardous materials from all sources in Ontario from both the residential and IC&I sectors. Disposal includes materials sent to landfills, dumps and incinerators, including those located outside Ontario.

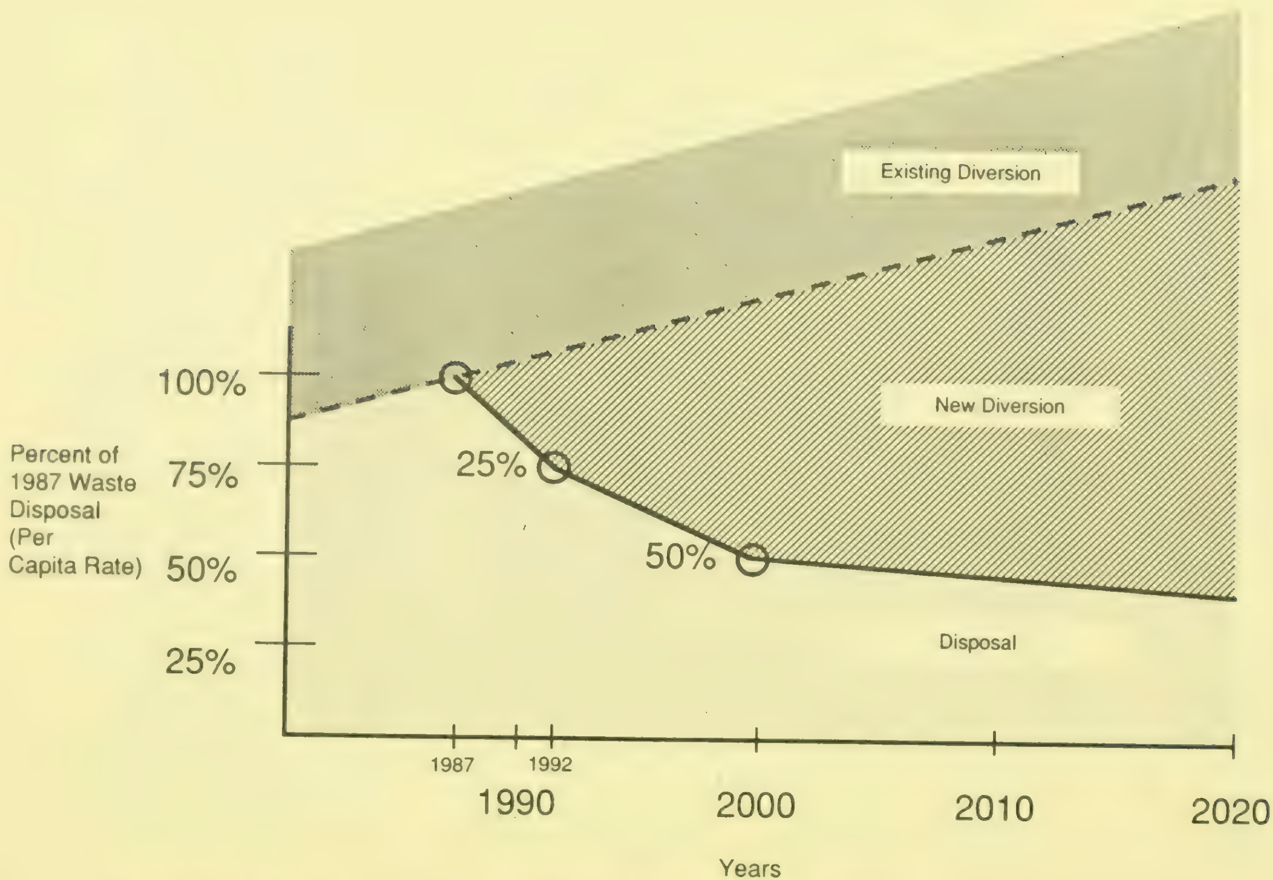


Figure 1: Illustrative Trends in Diversion and Disposal

3.0 FACTORS AFFECTING MEASUREMENT OF WASTE DIVERSION

The amount of materials diverted from disposal is difficult to measure, and is subject to many complex variables such as shifts in population, employment, industrialization, economic growth, and international markets. To measure diversion from disposal, one has to measure the changes in the amount of waste going to disposal. Complex demographic and socioeconomic factors cause variations in the disposal of residential waste, while changes in production levels, automation, employee numbers, sales revenues, product design, and markets directly affect the types and quantities of waste generated by IC&I organizations.

As the Ministry develops forecasting models, these variables will be taken into account when reporting diversion figures and developing realistic projections for diversion.

4.0 TWO WAYS OF MEASURING PROGRESS TOWARDS THE WASTE REDUCTION TARGETS

Two ways to measure progress against the targets have been developed. Both formulae are indicators of social change from a "consumer" to a "conserver" society. The *Per Capita Diversion Rate* reflects changes in disposal which take into account the changing population base of the province. The *Absolute Diversion Rate,* based on actual tonnages, provides a way to forecast landfill requirements. An increase in the per capita diversion rate will not necessarily lead to an absolute decrease in the number of tonnes of waste going to disposal if the population rises significantly.

For purposes of monitoring achievement of the province's waste reduction targets, the *Per Capita Diversion Rate* will be used by the Ministry of the Environment.

4.1 Per Capita Diversion Rate

Waste discarded by the residents and enterprises of Ontario varies in quantity with the size of the population living and working in the province. This formula reflects changes in the population base when monitoring diversion. It is calculated as follows:

$$\frac{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}} - \dfrac{\text{19-- Waste Disposal}}{\text{19-- Population}}}{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}}} \times 100$$

where "Waste Disposal" is measured in tonnes.

The result of the calculation gives the per capita percentage of diversion achieved in any year relative to the level of waste disposal in 1987.

4.2 Absolute Diversion Rate

Landfills do not expand in relation to population or industrial growth. Consequently, using a formula based on population change is inappropriate for landfill planning. Therefore, the absolute diversion rate formula, as shown below, will be used to monitor landfill requirements:

$$\frac{\text{1987 Waste Disposal} - \text{19-- Waste Disposal}}{\text{1987 Waste Disposal}} \times 100$$

where "Waste Disposal" is measured in tonnes.

The result of the calculation gives the rate of diversion in a target year based on the amount of waste generated in 1987 as the reference base.

5.0 UNITS OF MEASURE

The Ministry monitors diversion and disposal by weight. The metric tonne provides a common unit of measure across material types and waste processing methods (e.g. compaction equipment for truck loads and landfills). Tracking weight rather than volume is also appropriate when considering marketing requirements and diversion programs (such as procurement policies and product design). Sales of secondary materials are typically based on weight rather than volume.

While landfill reach capacity by volume rather than weight, it is easier to measure waste going into a landfill by weight. Automated weigh scales record the weight of a truck as it enters and leaves the facility, providing a simple recording mechanism. Tracking volumes is more labour intensive and prone to error. Conversion of tonnes of landfilled material to volumetric measures can be calculated and landfill capacity levels measured.

6.0 APPLICATION OF THE WASTE DIVERSION FORMULAE

The waste reduction targets were established to encourage the diversion of waste from disposal to productive uses for the province as a whole. Since the original announcement of the targets, some municipalities and IC&I organizations have indicated a desire to apply the targets to their waste reduction efforts. The following sections indicate how individual municipalities and IC&I organizations might apply the formulae.

6.1 Monitoring Diversion for the Province

On a province-wide basis, the Ministry will calculate attainment of the targets using the *Per Capita Diversion Rate*. The Ministry is not measuring the attainment of the targets by individual municipalities or IC&I organizations.

6.2 Municipalities Monitoring Diversion

For purposes of consistency, individual municipalities or groups of municipalities (such as a waste management system planning area) may use the *Per Capita Diversion Rate* formula to assess their own performance. This will assist municipal waste management planners to compare local diversion achievements in their planning area to the province as a whole or to other planning areas. On the other hand, waste reduction targets based on an *Absolute Diversion Rate* will assist in the sizing of waste management facilities. Either approach is acceptable as a waste management system planning objective.

6.3 IC&I Organizations Monitoring Diversion

The Ministry recognizes that factors such as changing market share, product mix or automation may make year-by-year comparisons difficult for some IC&I organizations. Similarly, changes in municipal population figures do not proportionately change the amount of waste produced by a business. Therefore, the Ministry is working with IC&I representatives on a task force to determine the appropriate adjustment factors.

In the meantime, an IC&I organization interested in assessing its own performance can apply the *Absolute Diversion Rate* formula.

7.0 WASTE MANAGEMENT SYSTEM MONITORING

A waste management system can be viewed as a network of "streams" of waste and recoverable materials beginning at the source of generation, and moving through collection, processing, and disposal. The rate, magnitude and direction of movement are dimensions of the waste management system which may be measured.

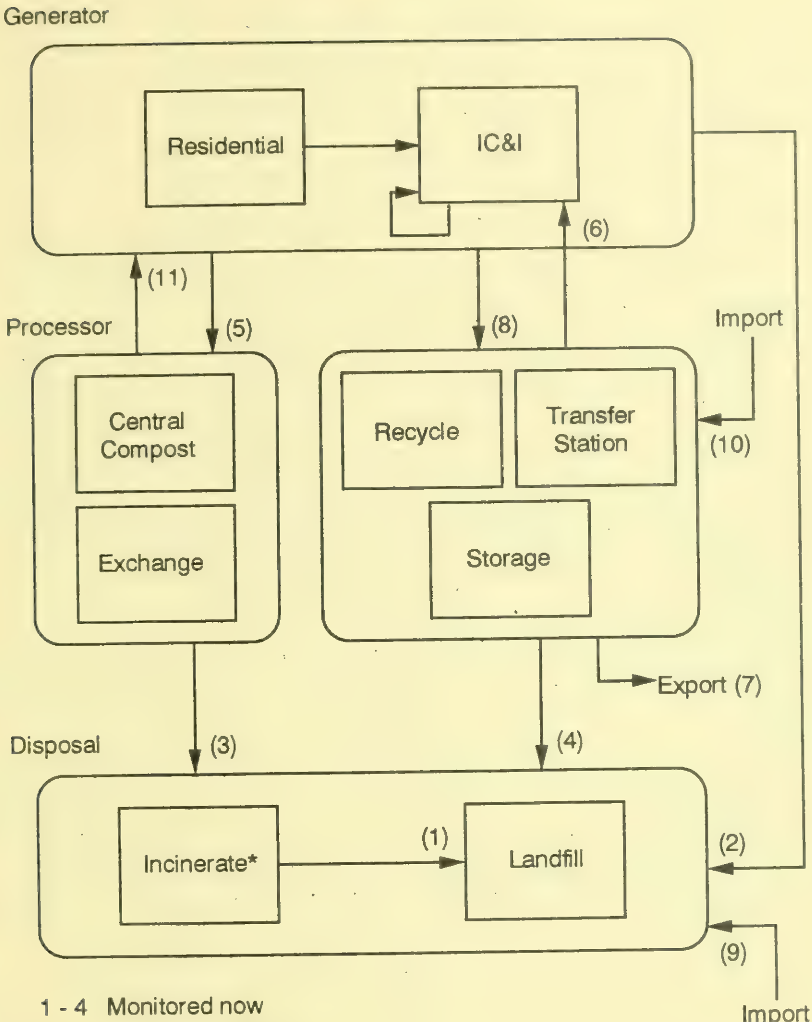
To provide effective support to municipal and IC&I efforts to divert waste from landfill and to achieve the province's waste reduction targets, the Ministry monitors the various streams of waste and recoverable materials. Figure 2, "Waste Management System Monitoring Model", depicts the flow of materials through the waste stream, and identifies key points at which data can be collected. The arrows indicate the flow of wastes and secondary materials; the arrowheads indicate the points at which the flows can be monitored. The boxes indicate the generators, processors and disposers of waste.

Generators: The boxes in the top section of Figure 2 show the sectors that discard materials into the waste stream. Waste generators, including households and IC&I organizations, discard materials that are sent directly to waste disposal facilities (2) or to processing facilities (5, 8). Some material is diverted from the waste stream through on-site composting or through 3Rs initiatives managed by the generators. To implement the province's *Waste Reduction Action Plan*, the Ministry, through its Waste Reduction Office, is developing support programs to help organizations take an audit of their waste and to take steps to reduce it.

Processors: The boxes in the middle section of Figure 2 show the types of facilities that process the waste stream to recover secondary materials. Waste processors receive materials collected by municipalities through the Blue Box or other municipal 3Rs programs, from waste management companies, or directly from individual generators (5, 8, 10). After processing, materials are sold to individual generators (6, 11), or sent for final disposal (3, 4, 7). Waste processors are grouped as follows:

- Central compost facilities process leaf, yard and food wastes collected from residences and IC&I organizations. The resultant material is available to households or IC&I organizations.

- Exchange facilities, such as salvage operations and waste exchanges, provide a mechanism for households and IC&I organizations to trade materials for which no ready market exists. Exchanges may receive materials for subsequent distribution or may act as a broker connecting



1 - 4 Monitored now
5 - 7 Monitored 1992
8 Monitored 1992/93
9 - 11 Monitored 1993

* Existing Facilities only

Figure 2: Waste Management System Monitoring Model

suppliers with customers.

- Recycling facilities process source-separated materials for sale and distribution to markets.

- Storage facilities receive and store source-separated materials that exceed current market demand.

- Transfer stations receive small loads of materials, sort them, and ship large loads to final destination points (disposal facilities or recyclers).

Disposal: The boxes in the bottom section of Figure 2 show the facilities dealing with final disposal of residual waste, e.g. incinerators and landfills. New facilities for the incineration of municipal solid waste have been banned in Ontario, although existing incinerators may continue to operate under stricter environmental control requirements. Incinerator operators are required by the Ministry to measure quantities of materials received as well as residual ash sent for subsequent disposal. Landfills are the ultimate end of the waste stream flow. All residuals from 3Rs activities, business operations, waste processing and incineration are deposited in landfills.

At present, the Ministry monitors materials received at municipally-operated waste disposal facilities (points 1, 2, 3, 4). To get a complete picture of disposal, regulations are being considered to require reporting from disposal and diversion facilities operated by private waste managers (1, 2, 3, 4).

In the future, waste and secondary materials handled by material recovery and central compost facilities also will be tracked (5, 8), as will materials shipped from material recovery facilities to secondary markets (6, 11), exports (7) and imports (9, 10). As more IC&I organizations undertake waste audits, they will build up a comprehensive database that can be shared with organizations specializing in materials exchanges. Participation in such exchanges can lead to significant savings in disposal and other waste management costs.

8.0 TOWARDS A WASTE MANAGEMENT INFORMATION SYSTEM

Progress towards a conserver society can be measured by monitoring materials diverted from disposal. The Ministry of Environment's proposed Waste Management Information System will be a mechanism that allows such monitoring to be performed effectively. In addition to monitoring progress towards diversion targets, the data will be used to assist municipalities and IC&I organizations:

- To identify feasible waste diversion options;
- To identify secondary market opportunities;
- To assist in developing waste management systems plans;
- To support waste exchanges; and
- To develop and evaluate technical and funding support programs.

The system has several components, including: Standard Material Classes, a data collection process, a database to store the disposal and diversion figures, a computer system to process the data (the Waste Diversion Information System), models to estimate and forecast disposal, and a means to communicate progress.

8.1 Standard Material Classes

A task force consisting of representatives from municipalities, the private sector and Environment Canada compiled a list of Standard Material Classes (see *Appendix I*). The Standard Material Classes apply to materials which enter or leave the waste stream, from the point of discard, through source separation, collection and processing, to final marketing of the secondary material and/or disposal. By using Standard Material Classes when reviewing data on disposed or diverted materials, stakeholders will be able to identify material recovery facility and market requirements. The classes were developed to monitor materials sent to disposal and diverted from disposal rather than to specify product requirements. Future enhancements could include categories to address market requirements.

Under the proposed waste reduction regulations, the Standard Material Classes will provide the basis on which waste diversion initiatives can be monitored. The classification system is not intended to replace the material classes currently used by municipalities or IC&I organizations as they may be needed to track materials at a finer level of detail (e.g., light bulbs and window glass).

8.2 Data collection

The waste management system monitoring model specifies the points in the flow of waste and recoverable materials through the system where data can most readily be collected. Regulations to require reporting to the Ministry on the quantities of materials received by waste disposal and diversion facilities are being considered. The regulations would require that both municipal and private owners of waste processing and disposal facilities report the tonnes by

material type (Standard Material Classes) processed by each facility in the reporting period. The reports would also need to indicate the source sector (i.e., residential or IC&I) of the materials.

Reporting period frequencies will vary depending on the size of the municipality and availability of weigh scales.

Facilities with weigh scales: monthly reports where facilities serve municipalities whose population exceeds 100,000; quarterly reports from other facilities.

Facilities without weigh scales: quarterly reports from those facilities which can estimate tonnages. The Ministry will work with municipalities to develop estimates of waste disposed.

The Ministry will calculate estimates of disposal and diversion for the remaining areas (such as unincorporated areas) using the provincial per capita waste disposal rate.

8.3 Database

The Ministry will maintain a database of materials diverted and disposed of by facility, the standard material classes, waste management methods (various 3Rs initiatives and programs for diverting materials from waste disposal), and relevant municipal and facility data. The database also will contain successes published by either municipal or IC&I organizations.

8.4 Waste Diversion Information System (WDIS)

The proposed WDIS comprises a number of computer functions which manage waste diversion data. The functions include:

- Monitoring attainment of the provincial waste reduction targets;
- Maintaining an inventory of waste processing facilities:
- Estimating waste disposal for facilities without weigh scales or estimating models;
- Recording diversion by municipalities against provincial diversion targets;
- Recording diversion by IC&I organizations against waste audits and

workplans and packaging audits and workplans;

- Monitoring 3Rs funding programs;

- Monitor disposal and diversion for waste management system areas; and

- Forecasting waste disposal and diversion for municipalities or waste management system areas.

The Ministry plans to provide direct computer access to WDIS in 1993 in order to minimize the number of printed reports required. Security measures will be in place to protect confidential data pertaining to waste diversion and disposal. In addition, the Ministry will provide the specifications required to exchange data electronically to IC&I organizations or independent software vendors. The Ministry encourages the development of electronic data exchanges both in submitting and retrieving data.

8.5 Forecasting Models

The Ministry is developing methods to estimate 3Rs diversion tonnages. Once these models have been evaluated and tested, they will be published for comment. Waste managers in those areas without weigh scales or other accurate monitoring methods can use the models to estimate disposal and diversion. The forecasting models will be available for use by planners developing waste management system plans or those identifying material recovery facility requirements.

8.6 Communicating Progress

The Ministry will report the provincial diversion and disposal totals on a quarterly basis. Case studies of initiatives that achieve high diversion rates will be published as will other information about diversion opportunities.

The Ministry hopes to improve its communication with municipalities and IC&I sectors and will provide them with the following:

- Reports on disposal and diversion to organizations submitting data;

- Reports showing attainment against provincial targets; and

- Available figures explaining external causes that affected base figures (e.g. recession, free trade, population variances).

9.0 CONCLUSION

To foster greater efforts by the municipal and IC&I sectors to minimize waste, the Ministry continues to provide support through technical outreach, information papers, funding programs, and development of the Waste Diversion Information System.

The Ministry views the management of waste as a significant mechanism for conserving Ontario's resources and environment. Ontarians working together can develop a conserver society and become leaders in developing ways to minimize waste and maximize secondary resource usage.

APPENDIX I - STANDARD MATERIAL CLASSES

CODE	MAJOR CATEGORY	SUB CATEGORY	EXAMPLES
400	Glass	Clear Beverage	Clear wine bottle, juice bottle
410		Coloured Beverage	Beer Bottle, Coloured wine bottle
420		Mixed Beverage	Clear and coloured bottles
430		Clear Container	Jam jars, pickle bottles
440		Coloured Container	
480		Mixed Glass	Comingled glass container & beverage
490		Other Glass	Heat resistant glass, laminated glass, wired glass, mirrors, plate glass, mineral wool, wool glass, light bulbs or tubes, glass blocks or brick, insulators
499		Composite Glass	Predominantly glass
500	Paper	Corrugated	Corrugated, old boxes, corrugated new cuttings
510		News Print	News, printed (old and overissued) unprinted, other groundwood, sulphate
520		Boxboard	Boxboard cuttings, mill wrappings
530		Fine Paper	Office, computer, ledger
580		Mixed Paper	Comingled classified paper
590		Other Paper	Kraft, magazines, coated paper, carbon paper
599		Composite Paper	Predominantly paper
600	Wood (Processed)	Packaging	Pallets, skids, crates
610		Mfg Residual	Offcuts, chips, shavings, sander dust, sawdust
620		Building Material	Veneer, lathing, flooring, doors, frames, lumber, forms, mouldings
680		Mixed Wood	Comingled classified wood
690		Other Wood	Treated wood, painted wood, plywood, chipboard, particleboard
699		Composite Wood	Predominantly wood
700	Vegetation	Leaf & Yard	Hay, straw, grass clippings
710		Brush	
720		Stumps	
780		Mixed Vegetation	Comingled vegetation
790		Other Vegetation	Non-classified vegetation
799		Composite Vegetation	Predominantly vegetation

CODE	MAJOR CATEGORY	SUB CATEGORY	EXAMPLES
800	Food	Fruit/Vegetables	
810		Protein	Meat, Fish, Poultry
820		Fats/Oils	
830		Grain Dust	
840		Bones	Carcasses
880		Mixed Food	Comingled food
890		Other Food	Stale dated food, condemned food
899		Composite Food	Predominantly Food
900	Metal	Ferrous Metal	Iron, steel (e.g. magnetic)
910		Aluminum	Cans, car parts, poil, wiring, tubes
980		Mixed Metal	
990		Other Non-ferrous Metal	Brass, lead, copper
999		Composite Metal	Predominantly metal
1000	Plastic	PET	2 litre plastic soft drink bottles, plastic liquor bottles, some vegetable oil and bottled water bottles.
1010		Other Thermoplastic	HDPE (milk jugs, large food tubs, motor oil bottles, most shampoo bottles, "krinkly" grocery bags, plastic pails). LDPE (shiny grocery bags, most grocery bags, plastic container lids, bread bags). PP (margarine and yogurt tubs, small tubs, syrup bottles). PS ("formed" disposable cups and plates, fragile clear plastic cups), PS is used for all disposable packages cutlery etc. used by fast food chains.
1020		Thermoset Plastic	ABS e.g. computer and telephone housings. PVC e.g. sewer & water pipes, some house d\siding, floor and wall covering, some consumer bottles.
1080		Mixed Plastic	Comingled plastic
1099		Composite Plastic	Predominantly plastic
1100	Textile/Fabric	Natural Fibre	Wool, cotton, linen, leather
1110		Manmade Fibre	Nylon, acrylic, polyester
1180		Mixed Textile	Comingled classified textile
1199		Composite Textile	Predominantly textile/fabric

CODE	MAJOR CATEGORY	SUB CATEGORY	EXAMPLES
200	Rubber	Tires	
210		Hose, Belting	
220		Foam	Carpet underlay
230		Rigid	Shoes, auto mounts
240		Sheet	Innertubes, floor mat
280		Mixed Rubber	Comingled classified rubber
290		Other Rubber	Non-classified rubber
299		Composite Rubber	Predominantly rubber
399	Asphalt	Composite Asphalt	Predominantly asphalt
499	Drywall	Composite Drywall	Predominantly Drywall
500	Earth Material	Soil	Clay, sand, dirt
510		Aggregate	Gravel, rock
520		Concrete Products	Concrete, plaster, rubble
580		Mixed Earth	Comingled earth material
590		Other Earth Material	Non-classified earth material
599		Composite Earth Material	Catch Basin Cleanings, Street Sweepings
600	Ash	Fly Ash	
610		Bottom Ash	
680		Mixed Ash	Comingled ash
699		Composite Ash	Predominantly ash
799	Asbestos	Composite Asbestos	Predominantly asbestos
899	Sludge/Filter Cake	Composite Sludge	Predominantly sludge
900	Composite Materials	Electronical Equipment	T.V., Stove, fridge, microwave, stereo, motors
910		Furniture	Table, chair, bed
930		Diapers	
940		Household Hazardous Waste	Batteries, paints/solvents, household cleaners, motor oil
970		Mixed Dry Waste	Comingled dry materials
975		Mixed Wet Waste	Comingled wet materials
980		Mixed Solid Waste	Mixed materials (wet & dry)

REDUCE

REUSE

RECYCLE

THE WASTE CRISIS IN THE GREATER TORONTO AREA

A Provincial Strategy for Action

Ontario
Environment
Environnement

Ontario
Office for the Greater Toronto Area
Bureau de la region du grand Toronto

Disponible en français

PREFACE

This paper outlines a series of actions to be undertaken by the Government of Ontario to resolve the waste crisis in the Greater Toronto Area (GTA). These actions fall into three categories:

o Actions to accelerate and intensify "3Rs" waste reduction and diversion programs in the Greater Toronto Area so that the need for disposal capacity for residual wastes is decreased significantly;

o Actions to increase residual waste disposal capacity in the Greater Toronto Area through an accelerated search for and selection of long-term landfill sites consistent with the principles of environmental assessment; and

o Emergency actions to close the "disposal gap" or expected shortfall in waste disposal capacity between the time that existing GTA landfill sites are slated to close (starting in 1992) and the opening of the long-term landfill sites.

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INTRODUCTION

Much Has Happened, Much Remains To Be Done

Ontario is a world leader in the conserver approach to waste management. Enormous strides have been made to divert the huge amount of municipal solid waste we generate from disposal to productive uses through the 3Rs of waste management - reduction, reuse and recycling. These achievements are testimony to the level of partnership and commitment to action by municipal and provincial governments, by industry, labour, environmental and community groups, as well as by individuals.

Nevertheless, much more remains to be done in a very short timeframe to ensure that the provincial targets of at least 25 per cent waste diversion from disposal by 1992 and at least 50 per cent by the year 2000 are to be achieved.

The need to speed up waste reduction efforts in the province was addressed by the Minister of the Environment on February 21, 1991 with the announcement of a series of regulatory, financial and policy initiatives comprising *Ontario's Waste Reduction Action Plan*. To oversee implementation of the plan and other waste reduction initiatives province-wide, the Waste Reduction Office was created within the Ministry of the Environment.

However, even when the provincial waste reduction targets are actually achieved, there will still be a substantial amount of "residual waste" requiring disposal. Residual wastes are the materials left over after we have fully reduced, reused and recycled. Environmentally-secure disposal is the only responsible option for managing these wastes. Yet, the amount of available disposal capacity in Ontario is rapidly diminishing. Many municipalities will experience a "waste crisis" by the mid-1990s. Some have already reached that critical stage.

The Waste Crisis in the Greater Toronto Area

Nowhere in the province are the dimensions of the waste crisis as obvious and as challenging as in the Greater Toronto Area.

The Greater Toronto Area (GTA) is a highly integrated metropolis which includes the Municipality of Metropolitan Toronto and the Regional Municipalities of Peel, York, Durham and Halton. Within these five "upper-tier" municipalities, there are 30 "lower-tier" municipalities. The population of the GTA is 3.9 million.

Though the GTA accounts for less than one per cent of Ontario's land area, it has a disproportionate environmental and economic impact on the rest of the province. It contains 44 per cent of Ontario's total population, provides about 40 per cent of Ontario's total economic output, and about 45 per cent of the province's employment base.

With the 4.7 million tonnes of solid waste it produces every year, the GTA also accounts for nearly half of Ontario's total waste stream. Person-for-person, this level of waste generation is one of the highest in the world and it puts an enormous strain on the GTA's disposal capacity. Even with an effective waste reduction program, the need to dispose of residual wastes in the GTA will likely increase, as population is expected to grow to 6 million by the year 2021.

The problems surrounding waste management in the Greater Toronto Area have already reached a critical stage. Important waste reduction initiatives undertaken by GTA municipalities such as increased tipping fees at landfills, comprehensive residential blue box programs, home composting, central composting, bans on recyclable material going to disposal, and an extensive public education program, have helped substantially to reduce the demand for residual waste disposal, but not enough to appreciably extend the life of the GTA's three available landfills: Britannia Road (Peel Region), Keele Valley (York Region) and Brock West (Durham Region).

THE GREATER TORONTO AREA

As of January 1, 1991, the GTA had only 9.4 million tonnes of remaining residual waste disposal capacity. With the exception of Halton Region, which has an approved landfill scheduled to begin operation in 1992, waste disposal capacity in the rest of the GTA will start to expire in spring 1992 and will be completely exhausted by mid-1994.

EXISTING LANDFILL SITES	WASTE ACCEPTED Million Tonnes Per Year	REMAINING CAPACITY in Million Tonnes	SCHEDULED CLOSURE
Britannia Road	0.6	0.7	Spring 1992
Brock West	0.5	0.5	Spring 1992
Keele Valley	2.7	8.2	Summer 1994

The Disposal "Gap"

The first priority is the reduction of waste. Nevertheless, when the GTA reaches the provincially-mandated waste diversion targets (at least 25 per cent by 1992 and at least 50 per cent by the year 2000), large quantities of residual waste will still need to be disposed. The search for new landfill sites has begun. But a waste disposal "gap" will occur when existing capacity expires before new capacity is in place.

The size of the gap (the excess of residual waste demand over capacity), will depend upon the success of waste reduction and how soon new landfill sites can be put into operation. It is expected that new sites can be found, approved and opened some time in 1995: at least 2.5 years after the Britannia Road site reaches capacity and 9 months after the Keele Valley site reaches capacity. However, the time required for appropriate environmental assessments may extend this date.

In Search of a Solution

The problem of disposal capacity in the GTA was not entirely unforseen.

In Ontario, municipal governments are responsible for developing and operating environmentally-secure waste management facilities that keep pace with residential, commercial and industrial expansion. Municipalities use their waste management master plans and supporting documents as the tools for implementating landfills and other waste management system components. The plans are then submitted for approval under the Province's environmental assessment process. Such planning, including public consultation and the siting of disposal facilities, were undertaken by the upper-tier GTA municipalities during the 1980s. Thus far, however, only Halton Region has received approval for its plan and a 2.0 million-tonne landfill site to accept only waste generated from within the Region.

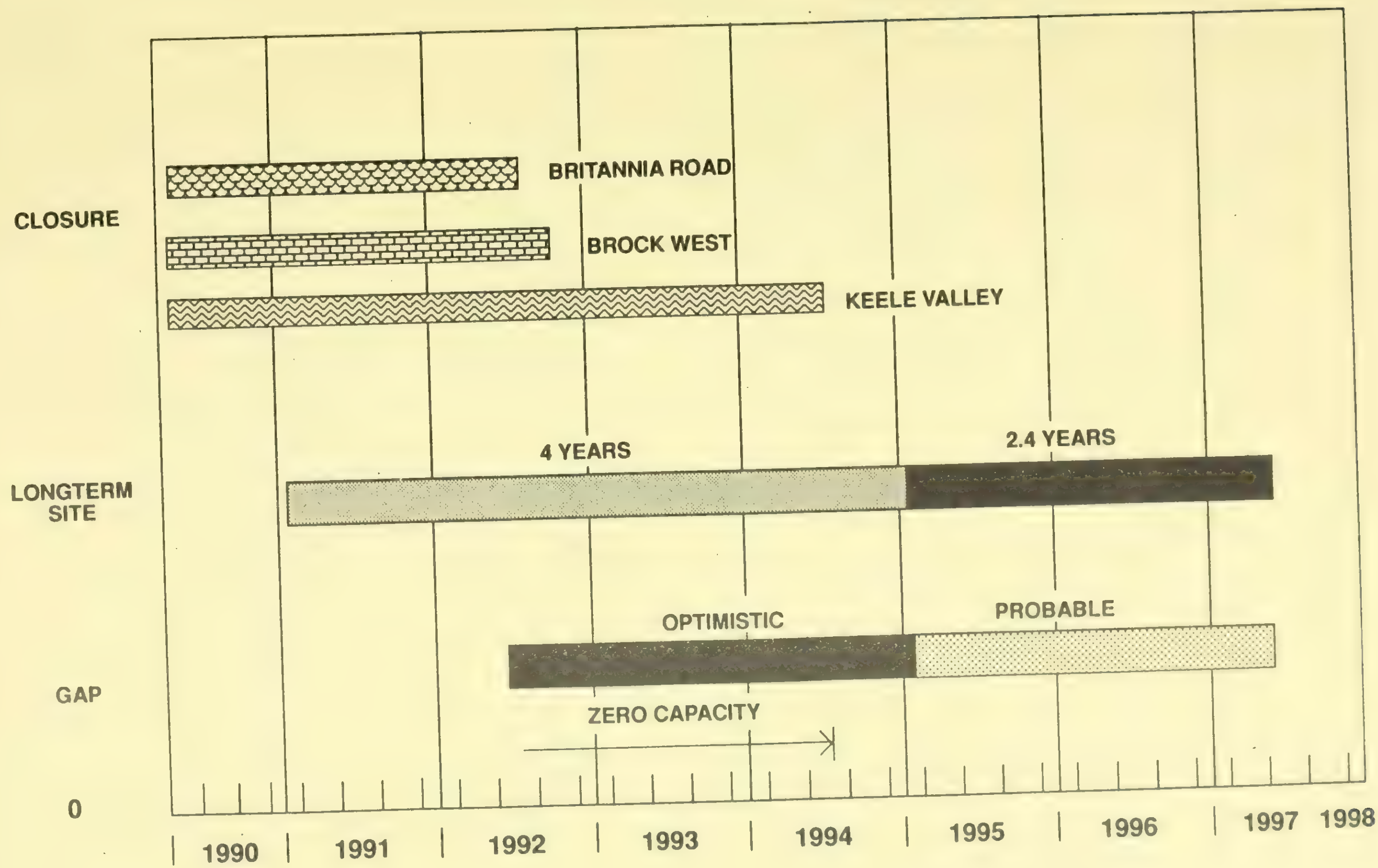
In March 1989, the Solid Waste Interim Steering Committee (SWISC) was formed when the Province brought together the five GTA regions to prepare a collaborative strategy for developing a solid waste management system.

SWISC was comprised of the Chairpersons of the Regional Municipalities and Metropolitan Toronto, and the Chairpersons of the respective Works Committees, as well as the Deputy Ministers of the Environment and the Office for the Greater Toronto Area.

SWISC was working to have long-term waste management facilities in place by 1996. In the short term, it identified two emergency landfill sites - in Whitevale (Durham Region) and Brampton (Peel Region) - to cover the shortfall in landfill capacity that was expected to occur between 1992 and 1996. These sites were granted exemptions from approvals under the *Environmental Assessment Act* by the previous government in July 1990.

On November 21, 1990, the Minister of the Enviroment in the current government announced a comprehensive waste management strategy for the province and the GTA, which

THE DISPOSAL GAP



included three initiatives:

- o Emphasis on waste reduction and reuse over recycling in the hierarchy of the 3Rs of waste management;

- o Changes to the *Environmental Assessment Act* process to keep it environmentally sensitive, while making it timely and cost-effective; and

- o Establishment of a new public sector authority to search for, select and start-up long-term landfill sites in the GTA consistent with the fundamental principles of the *Environmental Assessment Act*.

In addition, the Minister suspended exemptions to the *Environmental Assessment Act* which had been granted by the previous government to new short-term landfill sites in Whitevale and Brampton. The exemptions would have placed the sites in a faster approvals process under the *Environmental Protection Act*, but still not fast enough to avert the disposal gap.

The Minister also recognized SWISC's contribution, but indicated that the process designed by the previous government to solve the GTA waste crisis was not working fast enough. This announcement, in effect, concluded SWISC's formal site search activity and it became an advisory body to the Ministry on the role and mandate of the new public sector authority.

The public sector authority to search for new disposal capacity in the GTA was subsequently incorporated under the *Business Corporations Act* as the "Interim Waste Authority Ltd." With the creation of the Interim Waste Authority, under the jurisdiction of the Office of the Greater Toronto Area, the Solid Waste Interim Steering Committee was dissolved.

On April 2, 1991, the Minister Responsible for the Office for the Greater Toronto Area announced that the search for long-term waste disposal sites by the Interim Waste Authority would not include sites outside the GTA. Three landfill sites will be selected by the Authority: (a) a site in Durham Region servicing Durham's residual waste disposal needs; (b) a site in Peel Region servicing Peel's residual waste disposal needs; and (c) a site in Metropolitan Toronto or York Region to serve the residual waste disposal needs of these two upper-tier municipalities.

Providing Leadership

The Government of Ontario's program to deal with the waste crisis in the GTA is based on the principles of the conserver approach to waste management and includes the following:

o Actions to accelerate and intensify "3Rs" waste reduction and diversion programs in the Greater Toronto Area so that the need for disposal capacity for residual wastes is decreased significantly;

o Actions to increase residual waste disposal capacity in the Greater Toronto Area through an accelerated search for and selection of long-term landfill sites consistent with the fundamental principles of environmental assessment; and

o Emergency actions to close the "disposal gap" or expected shortfall in waste disposal capacity between the time that existing GTA landfill sites are slated to close (starting in 1992) and the opening of the long-term landfill sites.

ACCELERATION OF WASTE REDUCTION AND DIVERSION PROGRAMS

Objective

To accelerate and intensify "3Rs" waste reduction and diversion programs in the Greater Toronto Area so that the need for disposal capacity for residual wastes is decreased significantly.

Responsibility

Initiatives to accelerate waste reduction in the GTA, as described below, will be undertaken co-operatively by the upper-tier GTA municipalities and the Ministry of the Environment through its Waste Reduction Office. The Waste Reduction Office will provide the lead provincial role.

The Waste Reduction Office was established in February 1991 to co-ordinate the province-wide implementation of Ontario's Waste Reduction Action Plan and the development of other initiatives which will achieve the Province's waste reduction targets. Many of the initiatives in the GTA to be undertaken by the Waste Reduction Office will have important province-wide implications. The Office's key responsibilities in relation to GTA waste diversion and reduction efforts will be to co-ordinate the development and implementation of GTA action plans, to undertake the educational programs needed to achieve the successful implementation of the plans and to ensure that the programs, techniques and technologies employed are of the best and highest quality.

Guiding Principles

- *Partnership*: The development of an accelerated 3Rs program for the GTA will be a joint public and private sector and community effort involving the Province, the

upper-tier municipalities of the GTA, industries, community groups and broad cross-section of other stakeholder groups. The program will address workplace, household and institutional waste management needs and practices.

o *Environmental Integrity*: The siting and design of specific 3Rs facilities will be subject to a stringent but streamlined environmental approvals process.

o *Financial Stability*: Following consultation with the Province, the upper-tier municipalities will implement an accounting and pricing regime that will ensure that all users of waste management services will be charged in accordance with the long-term and ongoing technological, environmental and social costs of all aspects of waste management.

o *Technical Excellence*: The Waste Reduction Office will encourage and support such research and development as is required to monitor and evaluate the techniques, technologies and facilities established in conjunction with the GTA accelerated waste reduction and diversion program in order to ensure that they are of the highest quality.

o *Economic Benefits:* Implementation of the GTA's accelerated waste reduction and diversion program will entail substantial public and private sector investments. The Province of Ontario is committed to working in partnership with municipal governments and the private sector to maximize the economic benefits that flow from such expenditures. In particular, it will encourage and support the development and implementation of 3Rs techniques and technologies likely to find markets thoughout Ontario, across Canada and abroad.

o *Model Programs*: The accelerated 3Rs program developed for the GTA will meet or exceed provincial waste reduction targets, will be consistent with Ontario's Waste Reduction Action Plan and will provide a model for the implementation of waste

reduction and diversion programs across Ontario.

- o *Accountability*: Accountability to the environment and to future generations will be the hallmark of the accelerated 3Rs program developed for the GTA. Product stewardship will form the keystone of the GTA, as it will throughout Ontario.

- o *Conserver Society Values*: The Province of Ontario is committed to ensuring that the waste management practices that evolve as a result of public and private sector and community efforts in the GTA will move us toward a conserver society as reflected in our homes, workplaces, institutions and places of play.

Actions

1. *Authority and Responsibility*: Legislation will be introduced in fall 1991 that will give authority and responsibility for 3Rs activities to the upper-tier GTA municipalities with the option of delegating specific powers to their respective lower-tier municipalities. Some of the activities which may be covered under the legislation include: planning, financing, designing, siting and constructing 3Rs facilities such as composting plants and materials recovery facilities (MRFs); requiring source separation of designated recyclable materials; establishing special collection systems for designated recyclable materials; and specifying the 3Rs treatment/disposal facilities to which waste generators may send waste. Implementation of 3Rs facilities will be expedited through amendments to the approvals process.

2. *Advisory Committee*: The Waste Reduction Office will co-ordinate the establishment and work of an inter-regional waste reduction advisory committee. The work of the committee will provide the Minister of the Environment with the best information available on the ways and means of best implementing an accelerated 3Rs program for the GTA. As well, the committee will assist in the development and promotion of the

program. It will include representatives of Metropolitan Toronto and the Regional Municipalities of the GTA (municipal waste reduction staff and works committee chairs), community and environmental groups, labour unions, educators, private sector recyclers, composters and waste generators.

3. *GTA Waste Reduction Action Plan*: In co-operation with the inter-regional waste advisory committee, the Waste Reduction Office will co-ordinate the preparation of a comprehensive Greater Toronto Area waste reduction action plan that will encompass both public and private sector initiatives.

4. *Regional Waste Reduction Action Plans*: Metropolitan Toronto and each Regional Municipality will be required to submit its own waste reduction action plan based on the requirements provided by the Ministry of the Environment. These plans will be submitted on specified dates for review and approval by the Ministry.

5. *Funding Arrangements*: The Province will begin discussion with the GTA Regional Municipalities and Metropolitan Toronto on the funding of 3Rs capital expenditures and implementation of a comprehensive GTA waste reduction action plan (*Action Item 3 above*).

6. *Facility Approvals*: The Ministry of the Environment will undertake legislative and policy initiatives which will facilitate approval of 3Rs facilities such as composting plants and materials recovery facilities.

7. *Evaluation*: The Waste Reduction Office will monitor and evaluate the waste reduction programs, facilities, technologies and techniques established in the GTA for applicability to other communities in Ontario.

8. *Contingency*: The Waste Reduction Office may initiate experimental and/or

contingency programs to complement the 3Rs activities of the GTA Regional Municipalities and Metropolitan Toronto.

IN SEARCH OF LONG-TERM LANDFILL SITES

Objective

To increase residual waste disposal capacity in the Greater Toronto Area through an accelerated search for and selection of long-term landfill sites consistent with the principles of environmental assessment.

Responsibility

The Interim Waste Authority Ltd. has been established and incorporated under the *Business Corporations Act* with the mandate to:

- o Find three landfill sites, one within each of the following site search areas: (a) the Regional Municipality of Durham to service its disposal needs; (b) the Regional Municipality of Peel to service its disposal needs; and (c) the Regional Municipality of York and the Municipality of Metropolitan Toronto to service their disposal needs; and

- o Obtain environmental and other approvals for the sites, acquire the sites, construct and appropriately licence the sites.

Responsibility for managing and operating the sites will be determined through future discussions between the Province and upper-tier municipalities of the GTA. Hence, the "interim" nature of the current provincial authority.

Guiding Principles

- o *Environmental Integrity*: It must be demonstrated that the sites were selected and established in accordance with the fundamental principles of the *Environmental*

Assessment Act and with prudent regard for the importance of protecting the health and environment of citizens.

- *Local Responsibility*: Residual waste must be disposed of as close to the source of waste generation as possible. Long-term waste disposal facilities will be developed within three service areas of the GTA: Durham Region, Peel Region, and York Region and Metropolitan Toronto to satisfy their respective disposal needs. Each site, however, will be allowed to accept waste from other GTA Regions should there, for one reason or another, be difficulties with one particular site. Halton Region has an approved landfill under construction which will meet its disposal needs.

- *Compatibility with Conserver Principles*: The size and type of disposal facilities should not have a negative impact on waste reduction activities. Incineration, because it requires a large volume and constant flow of waste to justify the capital and operating costs, is not an acceptable option under the conserver approach to waste management. Thus, on April 11, 1991, the Minister of the Environment announced a new government policy that there would be no future solid municipal waste incinerators in Ontario.

- *Financial Sustainability*: All costs incurred by the Province in the selection, acquisition, construction and commissioning of sites will be recovered from future tipping fees when the sites are open.

- *Public Involvement*: The site selection process will respect government policy requiring effective, open, and meaningful public participation in the site selection process.

Actions

1. Three firms leading inter-disciplinary teams of consultants have been hired by the Interim Waste Authority Ltd. to begin the search for three landfill sites and to design and implement a public consultation program.

2. Assessment Design Documents (ADDs) for each of the three site search areas, will be prepared and released by the Interim Waste Authority for public consultation. The three documents will describe the proposed approach, purpose, search area, criteria to be used in selecting sites, alternatives to be considered, and a discussion on issues such as compensation and participant funding.

3. Legislation will be introduced in fall 1991 regarding the Interim Waste Authority and its site search activities and approvals process.

CLOSING THE "DISPOSAL GAP"

Objective

To close the "disposal gap" or expected shortfall in residual waste disposal capacity between the time that the existing GTA landfill sites are slated to close (starting in 1992) and the opening of the long-term landfill sites.

Responsibility

Public health and environmental security would be put at risk if a disposal gap were to actually take place in the GTA. The result would be a massive amount of garbage accumulating on public and private properties. Such a situation would not be tolerated by the affected communities. Though the "disposal gap" is expected to begin in spring 1992, and while every effort will be made to help extend current disposal capacity through an intensified 3Rs program, the lead time for the design and start-up of short-term disposal options necessitate almost immediate application of the emergency power provided under Section 29 of the *Environmental Protection Act* to the Minister of the Environment.

Section 29 of the *Environmental Protection Act* provides the Minister of the Environment with the power to order a municipality to "forthwith do every possible act and thing in its power" to ensure that waste be "collected or a waste management system or any part thereof be established, maintained, operated, improved, extended, enlarged, altered, repaired or replaced." This power is only used in exceptional circumstances where the Minister believes that it is in the public interest to provide emergency disposal capacity.

Guiding Principles

- *Stringent Application of the 3Rs*: Every effort will be made to limit the amount of waste through an accelerated 3Rs program, and thus extend current landfill capacity.

- *Local Responsibility*: Residual waste should be disposed of as close to the source of generation as possible.

- *Environmental Integrity*: Emergency disposal facilities will be designed with optimal environmental security measures.

- *Public Involvement*: The design, development and monitoring of emergency disposal capacity will involve local affected communities.

Evaluation of Options

In arriving at a strategy for dealing with the disposal gap, the following options were considered:

1. *Stretching the capacity of existing sites:* Waste deposited at landfills is compacted so that as much as possible can be put into a given space. It is regularly covered with soil to prevent problems such as odour and vermin. The question is whether technology exists which can reduce the volumes still further so that even more waste can be deposited in the same space as currently approved.

   The Ministry of the Environment examined the following options for stretching the capacity of the three existing GTA landfill sites:

- *Shredding: the shearing or milling of solid waste into small pieces.*

  Shredding is not currently practiced in Ontario. Its reported advantages are that it increases in-place waste density, reduces daily cover requirements, and is said to reduce debris, odour and vermin problems and generally improves site appearance.

o *Baling: high-density compaction of solid waste into dense rectangular bales.*

There are no known baling operations for landfill in Canada. The reported advantages are similar to those for shredding.

The drawbacks to both shredding and baling include the very high capital and operating costs involved, particularly when considered in terms of the remaining lifespan of the sites, unavailability of space for the related equipment and facilities, the high frequency of equipment breakdown and the limitations of the technology (not everything can be shredded or baled) which necessitates separate handling of some material. In addition, traditional compaction methods apparently achieve comparable in-place densities, but without the slowdown in the rate of decomposition which can result from shredding and baling operations. Potential space savings from shredding and baling are therefore considered to be minimal.

o *Landfill Mining: the excavation of previously buried waste to reclaim recyclables and organic soil for cover, freeing up capacity for new waste disposal.*

This is a new concept which has not been attempted in Canada and only to a limited extent in the United States. It appears to work well in warmer climates where decomposition occurs quickly. Costs can be offset by savings in cover requirements, but the technique carries the potential of explosions, noise, odour and other impacts, and exposes workers to hazards. It is not considered a feasible method for a short-term extension of the existing GTA landfill sites.

o *Synthetic Daily Cover: using foam instead of soil to cover garbage.*

A synthetic landfill cover has a much lower volume than conventional ground cover. Therefore, the site fills up less quickly. However, the material used is a urea-formaldehyde-based foam. Not enough is known about its toxicity, its impact on

leachate quality (leachate is the liquid formed when rain and snow infiltrate the site and mix with the waste), and its off-site environmental impacts. The foam presents practical problems as well. It washes off during rainstorms; when dry it can be blown away by high winds. In cold weather it requires warm water to activate it. The foam does not discourage birds, rodents and vermin.

Overall, the above technologies are not considered feasible solutions to the disposal gap problem in the GTA.

o *Surcharging: placing extra cover material or waste in a site without going beyond the planned contours but in such a ways as to accelerate settlement.*

Landfills naturally settle over time as wastes consolidate, collapse or decompose. The accelerated settlement achieved through surcharging permits the addition of waste beyond normal site capacity without changing the planned height or contour of the site. Metropolitan Toronto and Peel Region are successfully utilizing the surcharging of cover material at the three existing landfill sites to increase site settlement rates where possible. While a complementary option to overbuilding (see below), the surcharging option will not result in sufficient emergency disposal capacity.

2. *Moving the waste to other existing landfill sites within the GTA*: There are eight other landfill sites within the GTA, but their capacities are so small that their use would make virtually no difference to the disposal gap situation. Moreover, it does not make sense to disseminate GTA waste to a number of small sites, filling them up and causing capacity problems in those areas.

3. *Establishing temporary landfill sites within the GTA:* The Whitevale and Brampton sites had been chosen to provide interim landfill capacity for the GTA pending the establishment of new long-term capacity. It was the decision of the previous government to exempt these sites from the review and hearing process laid down in

the *Environmental Assessment Act*, a process which landfill sites are required to undergo.

This government, as demonstrated by the suspension of the two exemptions, is not prepared to permit new interim sites to be developed without going through a full environmental assessment process. The time required for the process would preclude the establishment of short-term sites to avoid the disposal gap.

4. *Transporting wastes to sites outside of the GTA*: This option for the long-term management of wastes is not acceptable. For the short-term management of wastes during the disposal gap, it is also not viable because of the large volumes involved. It will also simply result in a redistribution of waste, thereby transferring the waste crisis to communities outside of the GTA. However, transportation of wastes may be considered a feasible option in the event the GTA is only a few weeks or months away from having new landfill sites in operation.

5. *"Lifts" at the existing sites*: A lift, as it is commonly known, generally increases the height of a landfill beyond that originally proposed. Substantial new disposal capacity can be achieved in this manner.

   Lifts are considered to be technically and environmentally feasible for the Keele Valley and the Britannia Road landfills. On the other hand, the Brock West landfill is not considered to be a suitable candidate for a lift. It is older than the other two sites and not as well engineered. Its clay liner is experimental. A lift at Brock West could cause the liner/leachate system, and possibly the gas collection system, to fail.

Actions

1. *Lifts*: Metropolitan Toronto and the Regional Municipality of Peel will be directed to

increase the heights of the Britannia Road and Keele Valley landfill sites beginning in 1992 and 1994, respectively.

LIFT	LANDFILL SITE	TIMING
A	Britannia Road	Spring 1992
B	Keele Valley	Summer 1994

2. *Transfer Station:* A transfer station will need to be built to facilitate transport of wastes to the Keele Valley landfill from Durham Region. (The Keele Valley landfill is currently approved to serve Durham Region.)

3. *Environmental Impact*: The upper-tier GTA municipalities will be required to undertake additional, detailed studies to ensure that the lifts can be undertaken in a manner which meets the criterion of environmental integrity.

4. *Public Involvement*: Public liaison committees, representing communities adjacent to the Keele Valley and Britannia Road landfill sites, will be invited to participate in the development of engineering studies and implementation of the lifts.

5. *Legislation*: Legislation will be introduced to enable the lifts to be implemented.

6. *Funding Arrangements*: As part of the discussion process proposed in actions to accelerate the implementation of 3Rs programs in the GTA, the Province will establish an agreement with the upper-tier GTA municipalities with respect to funding the costs of closing the disposal gap.

A SHARED COMMITMENT

The initiatives contained in this provincial strategy to resolve the waste crisis in the Greater Toronto Area are far-reaching in scope. They also reflect the difficult challenges which face the provincial government and its municipal partners in dealing with the waste crisis not only in the GTA, but throughout Ontario. However, with a new shared commitment to moving Ontario forward towards a conserver society, where the goals of economic well-being exist in a natural harmony with the environment, these challenges will be overcome.

If you have comments on the provincial strategy to resolve the GTA waste crisis please write to:

Hon. Ruth Grier
Minister of the Environment
and Minister Responsible for the Office for the Greater Toronto Area
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

Additional copies of *The Waste Crisis in the Greater Toronto Area: A Provincial Strategy for Action* may be obtained by contacting:

Ministry of the Environment
Public Information Centre
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

(416) 323-4321

PIBS 1610

APPENDIX C

Summary of Comments Consulted

References of Public Consultation Materials Consulted

APPENDIX C

GTA 3Rs ANALYSIS EA
SUMMARY OF PUBLIC COMMENTS REGARDING 3Rs FROM PAST WASTE MANAGEMENT STUDIES

Reference Document/ Source	Comment
REVIEW OF IWA - PEEL REGION LANDFILL SITE SEARCH PUBLIC CONSULTATION ACTIVITIES	
EA Document II, Part 1, Volume 2 of 2, April 1992	Location for a large material recovery facility should be found.
	Consider composting at the municipal level.
	3Rs programs should be mandatory.
	Government should immediately pass legislation against over-packaging.
	Diversion not pursued as aggressively as possible.
	Not enough recycling facilities in place.
	Need more extensive recycling programs.
	Implement a User Pay system for garbage generated at residences.
	Educate children in schools about environment.
	Tax industries creating garbage and excess packaging.
	Increase public awareness of what an individual can do.
	Incineration and recycling is sophisticated in Japan, why can't we borrow technology?
	Need separate recycling bins outside shopping malls, especially cardboard.
	Should have note attached to items left behind, after blue box collection.
	Should be legal to scavenge for items from landfill sites.
	Tires are diverted from landfill, and yet extraordinary charges are being levied to remove them.
EA Document III, Volume 2 of 3, November 1992	Waste disposal methods similar to the Eco Farms Waste Management System should be considered. With this system, waste is separated into different materials and reprocessed back into raw materials to be used again. Organic material is reused as organic fertilizer and compost. This system was researched for seven years and was proven to reduce waste material by up to 95%.
	Waste reduction should be a priority.

Reference Document/ Source	Comment
	Why does Minister Grier put greater emphasis on recycling and incineration?
	Besides incineration, other waste disposal alternatives should be considered. For example, Europeans use sophisticated sorting facilities which feed pyrolysis or gasification plants. The sorting facility recycles many of the inorganic wastes while the gasification/ pyrolysis section produces petroleum gases and liquids. These are later separated into feed stocks for reuse in industry or for energy production. The final portion of waste that cannot be reclaimed or converted must be volumetrically reduced through high temperature incineration and the ash then landfilled. Such plants would be local to each community, thereby reducing truck traffic and providing employment opportunities. The "Not in My Backyard" syndrome would be eliminated since each community would become responsible for its own waste.
	Anaerobic digesters should be promoted as a viable option for disposing of large quantities of compostable waste.
	Despite the abundance of alternative waste disposal methods, the Ontario Government has stopped or significantly reduced efforts to find alternatives for disposing of municipal waste. The effort is limited to the grass roots household level.
	In terms of alternatives, it is recognized that some landfill capacity is required. The size of the proposed site however, does not appear to be consistent with the efforts to reduce, reuse and recycle.
	Not enough is being done to find alternative approaches to waste other than landfill. Greater efforts to reduce, reuse and recycle materials could be made and incineration is now feasible alternative, considering modern engineering techniques.
	We do not want to have to resort to drastic measures in order to get rid of our garbage. For example: garbage police, dumping in streets and near homes, and forced recycling.
	Are there any other plans for waste reduction in Toronto (i.e. user fees)?
	There is no such thing as a "safe site". Waste is waste! The solution lies in reducing waste and you do that by hitting the people in the pocket book, not by destroying the environment. Governments should charge each person for the amount of garbage they produce.
	The following alternatives to dumping should be considered: · eliminate economic subsidies to industry · mandate source separation · deposit on all beverage containers · pay by the bag for garbage disposal · product stewardship.

Reference Document/ Source	Comment
Peel Public Comment Database	More controls on generation of waste should be considered: · user fees · reduction of packaging · laws that prevent consumers from waste generating.
	In Germany and Switzerland all waste is hand-sorted to make sure that recyclable materials and HHW, including batteries, are removed from the waste being landfilled. This should happen in Canada too.
	Whoever makes garbage should take care of it. Why don't you deal with packaging?
	Emphasis should be on reduction (of waste). Styrofoam and other similar products should be banned.
	Why don't we recycle rugs?
	Why isn't recycling mandatory?
	Should incorporate 3Rs beyond that 50% goal.
	We want recycling plants to save the productive farmland.
	One of the most advanced composting systems in the world has been developed right here in Ontario - use it.
	I would like to see composting increase, especially of yard waste.
	Pleased with the Ministry's efforts to extend recycling program to Ontario residents from 50% to 90% by 1995. Wondering if there are any other plans for waste reduction in Toronto, such as implementation of user fees.
	The IWA could examine the work being done by companies such as Eco Farms Waste Management Inc. which argue that they can reduce the amount of material going to landfill by 95%.
	I am also strongly in favour of more stringent controls on our garbage quota of recycling, reusing and reducing waste.
	If more money was spent on 3Rs, we would not need landfill.
	If the government was to force the manufacturers to produce recyclable/reusable products, then the problem would be solved.
	Mandate source separation, deposits on all beverage containers, pay by the bag for garbage disposal, product stewardship.
	Nothing has been done to decrease garbage by incentives to industry or families.
	Find a way to sort waste so that paper, metals, plastics, wood and stone and their compounds are kept away from landfill and are recycled. Force product manufacturers and distributors to outline and guarantee non-landfill disposal for the items they sell.

Reference Document/ Source	Comment
	I believe the solution to Toronto's garbage lies in reducing the amount produced, levying realistic charges on disposal such that it is economic to recycle, so that recycling is not just seen as a good citizen's act.
	Companies, which are making good money on the products we use, should be taking their containers back.
	We request that alternatives be considered like almost total recycling by which garbage is reduced up to 50%; as ESDEX Recycling Corp. of Cookstown.
	A better approach would be to decentralize these facilities. Multi-technology plants would begin with sorting facilities to complete the recycling step. The non-recyclable portion would be transferred to a plant where the organic portion could be converted into industrial feed stocks. This step could include gasification, pyrolysis or anaerobic digestion. Finally, the portion that cannot be reclaimed or converted must be volumetrically reduced through high temperature incineration and the ash landfilled.
	It has been stated by some municipalities that the Blue Box program is too costly. What alternatives are there? Why do we have to store recyclable in warehouses? We must create markets and support initiatives from the private sector to conduct these recycled products into reusable commodities.
	Bill 143 states that it will become compulsory for the IC&I sector to have waste audits and definite plans of action to divert their waste from landfill. How about the residential waste: What will the revenue collected from the site be used for?
	We petition you and the government to start now to expedite alternatives to landfills. It is not only enough to provide blue boxes. We must constantly encourage and educate our population on the 3Rs. We must legislate over-packaging. We must reward developers and producers of biologically acceptable products. We must carefully follow and support the new technology which is becoming more and more ecologically viable.
REVIEW OF IWA - DURHAM REGION LANDFILL SITE SEARCH PUBLIC CONSULTATION ACTIVITIES	
Zero Garbage / Scugog Brief to C.E. McIntyre, IWA 13 July 1992	
Bill Lishman, A New Idea	Proposal for waste de-production facilities that would be responsible for reclaiming/recycling one stream of waste, i.e. small appliances, white goods, etc.
	No mass facilities only small facilities specializing in individual waste streams.
	Facilities would also be responsible for conducting research into recycling and reclamation of their particular waste stream.
	Also communities could host composting facilities.

Reference Document/ Source	Comment
	User-pay system would apply to all unsorted waste.
Bob Almack	Serious reduction and intensive recycling similar to North Hempstead, New York or Camden County, New Jersey.
	Present targets too conservative.
	Tough legislation to implement resource management rather than waste management.
	Source separate to get recyclable, repair and reclaimable, compostables and toxins out of the waste stream.
Submission of Briefs, Session July 13, 1992, at the Northview Community Centre, Oshawa - Meeting Notes	Manufacturers should have strict packaging laws.
	Collect garbage in paper sacks.
EA Document II, Part 1, Volume 2 of 2, April 1992	Need financial incentive to recycle.
	Lack of 3Rs initiatives and commitments in the Region.
	Will there be compensation to municipalities for enhanced recycling programs or penalties for not reaching appropriate levels of recycling?
	Will there be regulatory measures for waste reduction, i.e. ensuring a refund on bottles?
	Should be reusing and recycling items in old landfill sites - this would increase landfill capacity and create jobs.
	Need more recycling and reusing especially at the manufacturer's level.
	Will there be financial stimulus to encourage recycling?
	Tax relief should be provided to communities reducing garbage.
	Pay-per-use policy could be an incentive.
	Federal government needs to get more involved in regulating packaging (i.e. returnable and refillable).
	Manufacturers must "close the loop" by being responsible for disposing of their own products after consumers have finished with them.
EA Document III Volume 2 of 3, November 1992	Have they ever considered putting leaf compost in farm fields?
	First priority must be reduction but reduction will not happen without legislative assistance, and unless the urban producers are made aware of the garbage problem.
	Present waste diversion estimates are too conservative.

Reference Document/ Source	Comment
	Consider product stewardship.
	Mandatory reuse standards for consumer goods so that wastage and packaging is minimized, and life expectancy is maximized.
	Why doesn't the government go to the source and reduce waste?
	Government should establish laws to stop the manufacturing of non-environmentally friendly packaging.
	Need to approach companies to reduce the amount of wrapping they use, and to reduce garbage from construction.
REVIEW OF IWA - METROPOLITAN TORONTO/YORK REGION LANDFILL SITE SEARCH PUBLIC CONSULTATION ACTIVITIES	
EA Document III, Volume 2 of 3, November 1992	The IWA should emulate the "Green Dot Law" in Germany.
	Stricter policies regarding the 3Rs have to be implemented. These policies would include: · the government must put more effort into building markets for recycled products and materials · enforce businesses to conform to waste audits · residents of Ontario should pay more for waste disposal - this would lead to a reduction of waste generated.
	Alternative methods of landfilling should be examined. These would include: Eco Farms, the Martin System and Euro-Tech.
	A resolution of York Region Council was that the IWA process should be interrupted in order to assess the viability of waste processing as an alternative to a large landfill. Georgina Against Garbage (GAG) conveyed to Council that technology exists which can extract up to 95% of waste products from the waste stream.
EA Document II, Part 1, Volume 2 of 2, April 1992	Use separation companies for economic, efficient handling of waste within big cities.
	Intensify reduce and reuse.
	Mandate waste reduction and recycling.
	Expand fine paper recycling.
	Encourage positive local action - e.g. composting.
	Have recycling centres located at the landfill site.
	Return goods to their sources.
	Reuse scrap residues.
	Encourage reduced packaging - need an education campaign.

Reference Document/ Source	Comment
	Include aluminum in blue box pick-up.
	How are municipalities to fund 3Rs programs, policing of illegal dumping and special services such as "toxic taxis" and composting?
	Metro Toronto needs incentives to reduce the amount of garbage it produces.
Comments form IWA Metro/York Landfill Site Search Public Consultation Database	Move toward complete reduction and recycling as soon as possible.
	Decreases the amount of packaging that manufacturers create.
	All by-products of today's society should not be dumped in a hole; instead by-products should be separated and stored in above ground storage units. Also, biodegradable materials should be shredded and distributed as garden mulch.
	Start reprocessing garbage instead of dumping it.
	Reduction at-source waste should be managed using best available technology.
	If Metro Toronto cannot handle their own waste disposal, you should be instituting new regulations for the reduction of waste in that city.
	Why don't we divert our energies to reducing garbage everywhere and not trying to find a place to put it.
	Recycling should be implemented.
	Something needs to be done to enforce reducing waste.
	Get big business to change their packaging to disposables, charge a tax based on garbage generation, and increase peoples awareness to recycling and composting.
	One should invest in recycling facilities at any cost. User fees should go into waste management research and processes.
	We need to recycle, reuse and reduce. We also need to create constructive uses out of waste.
	Solid uncombustible waste has been compacted into solid blocks and used for such applications as blocks for roadbeds in Europe.
	Recycle more, produce less garbage, educate people and get them participating.
	Increase diversion strategies and further development of technologies for recycling post-consumer waste and markets for the resulting products.
	The government must put more effort into building markets for recycled products and materials, enforce businesses to conform to waste audits and regulate packaging.

Reference Document/ Source	Comment
	The government must look at alternatives including Wet/Dry sorts, municipal composting for residents.
	The Blue Box program should become the "normal" method of collection for glass, aluminum, and steel economic recycling materials, with fibreboard and paper as loss leaders. This collection should be free.
	Producers of containers must be made responsible for the collection of their unwanted products. Also, advertising should be restricted to the air waves not to newsprint.
	All discarded materials should be sorted, separated, crushed, compacted and stored in above-ground containers so that when our technology improves the resources stored can be readily reused.
	Nothing we have should be destroyed, it must be reused and recycled.
	Eco Farms approach should be used.
	Mandatory municipal recycling programs should be initiated to reduce waste going to landfills.
	Give incentives to reduce waste and penalties for excess packaging.
	Encourage more recycling.
	Apartments should be recycling. Excess packaging of food products should be eliminated.
	Government should convince the manufacturing sector to build repairable items.
	Government needs to promote a market for recyclables.
	Government should enact legislation which would force manufacturers to be required to take back their products and packaging - product stewardship.
	Government should promote 3Rs more.
	Government should be putting money into recycling and educating the public.
	Government should initiate a program to tell us what to throw out and what to recycle.
	Instead of 3 landfill sites in the GTA, why not establish a large waste recovery plant and only landfill the residue.
	Landfill bans, recycling and composting should all be enforced. Random checks of household waste could be done - similar to the RIDE program.
	Need to expand recycling efforts - especially in Metro Toronto.
	Should consider legislation to prevent sale of non-recyclable materials in stores.

Reference Document/ Source	Comment
Notes Taken at an Information Centre on Waste Diversion in the Greater Toronto Area, Tuesday, August 18, 1992, Community Information Centre, King City	Is it possible to accelerate 3Rs to increase diversion now?
	Will MOE ensure that recycling facilities will be approved so that the diversion targets can be achieved?
Notes Taken at an Information Centre on Waste Diversion in the Greater Toronto Area, Thursday, July 23, 1992, Community Information Centre, Stouffville	What portion of the organic waste stream is from restaurants, groceries and is any pressure being put on them to compost?
	What is being done to eliminate excessive packaging?
	Is it economically feasible to use recycled products as a source material? There need to be some tax incentives or other government support for these types of industries rather than punitive measures. Also government needs to provide more assistance to cover capitalization cost.
	Governments need to be putting more emphasis on market development. And you should be legislating a User Pay system.
Notes Taken at an Information Session on Waste Diversion in the Greater Toronto Area, Tuesday, July 21, 1992, Community Information Centre, Sutton	Should look at what is happening with waste diversion solutions in other countries.
	Bureaucratic approvals processes are working against the development of large scale 3Rs facilities.
	Government should provide incentives to industry in 3R solutions and support markets for 3R materials.
	Governments should build recycling factories instead of landfills.
	There should be source separation, as well as separation at landfills to assist in reaching diversion targets.
	People in Toronto should be forced to reduce.

Reference Document/ Source	Comment
COMMENTS FROM THE SWISC PUBLIC CONSULTATION PROGRAM OCTOBER 1989 TO JUNE 1990	
	Diversion of waste from disposal should be given top priority in the development of a waste management system.
	Individuals should take more responsibility for the solid waste they generate.
	Educational programs are needed to support the waste diversion goals.
	There is a need for action (whether it be taxation, legislation or something else) to deal with the issue of excess packaging of consumer products.
	Targets set for diversion are not high enough.
	It is important to ensure that markets exist for diverted materials.
	Enforcement of targets for diversion from disposal are required.
	Waste producers must take responsibility for disposing of the waste the create, perhaps through institution of a "producer-pay" system. While the survey indicates that 8 in 10 people support mandatory participation in 3Rs programs, only 37% agree with requiring householders to pay a fee for the amount of garbage put out at the curb.
	Need for more emphasis on the industrial/commercial/institutional sectors for 3Rs.
	Support for hierarchy of the 3Rs - reduce, reuse, recycle.
	Some members of the public suggest that the 3Rs Action Plan must place more emphasis on reduction at source.
	Lobby Federal and Provincial governments and manufacturers to initiate concrete solutions to the problem of overpackaging.
	Support for reusable or refillable glass containers. The results of the survey indicate that generally residents of the GTA prefer reusing glass containers through a deposit system to recycling them at the curb.
	Undertake leaf composting programs ... support these programs with a coordinated and comprehensive GTA-wide education program so the public knows how to participate.
	Need for comprehensive programs to encourage backyard composting.
	Legislation may be required in order to push recycling in the commercial and industrial sectors.
	Development of markets for end-products is critical in order to achieve diversion rates.
	Future markets can partly be developed through government policies favouring recycled products.

Reference Document/ Source	Comment
	Education on the 3Rs is an urgent priority and should reach all sectors of society.
	Education needs to provide practical "how to" information, but should also address the broader issue of lifestyle change.
	Support for the building of demonstration plans for recycling and composting.
METROPOLITAN TORONTO WORKS DEPARTMENT - SWEAP	
Master Plan "Composting" Comments	I have a home composter. Why didn't someone point out that takes a fair amount of strength to turn over the organic waste? It is useless for me.
	I would prefer the separate wet collection to composting, especially in the winter.
	Community vegetable gardening in our public park areas will provide a composting outlet for non-gardening members of the community. Crops could be contributed to the underprivileged or distributed to communities at a reduced cost.
	My composter is attracting rats.
	Don't have neighbourhood compost collection. Make people responsible for their own kitchen waste. If they see the garbage they produce, the will have to deal with it and change their habits. Right now garbage is out of sight out of mind. People will continue to jam recycling programs until you make your plan more aggressive.
	It's difficult for landscapers to wish to do the "right" thing with grass or twigs, etc. to contribute the material for centralized composting without having to pay to do it. More cooperative solutions should be made available.
	All homeowners should compost - it should be a law.
	Metro Toronto should investigate co-op composting in parks.
	How about apartment dwellers - where do they put their composters, in the bathroom? Get real! Composting is the prerogative of homeowners with gardens. What of the thousands of apartment dwellers?
	Large scale impact collection is needed, especially in the summer.
	Expand the home composting program - composting is so easy.
	I would like to see you buy restaurant composters from ECO Corp. This is a small Canadian company that really needs your business. I find that proper compost management is difficult for frail or elderly people. Some of us are just creating methane and harming the ozone.
	Compostible materials should be taken to a collection depot/truck situated at grocery stores.
	Home composting should be mandatory.

Reference Document/ Source	Comment
	I have read about Toronto food terminal having about 1/3 of its food it handles go to waste. What happens to this organic material? Does the plan consider trying to transport some of the organic back into the land where the food originally came from?
	By far the largest amount of my household waste is garden waste, i.e. leaves, grass, branches which cannot be disposed of using a single composting bin. Why not extend collecting garden waste (in clear plastic bags) throughout the years? Central composting has proved itself to be very popular.
	Suggestion - a neighbourhood leaf shredder in the fall. The leaves could be dug into gardens. Five bags of leaves would reduce to two, or people could bring leaves to the shredder. I think many gardeners would take advantage of this.
Master Plan "Blue Box" Comments	With regards to rigid plastics being accepted into the blue box, do you mean yogurt cups and ice cream containers? I would like to see all aluminum, i.e. pie plates, etc. as well as pizza boxes included in the blue box. I would also like to see broken dishes, styrofoam and mirrors going into the blue box.
	Blue box fine paper recycling is needed. Could plastic, such as the plastic around a case of coke, be recycled? Are flyers on shiny paper recyclable? Are envelopes recyclable? Peel collects clothes for recycling. Will that be done here soon?
	The blue box program will not work until the tax system is reconstructed and the cost of recycling is included in the cost of items purchased.
	I think the beverage industry could do more to reuse containers, e.g. special taxes/refunds.
	I would like to see the addition of the rigid plastics and plastic bags and wrappings. It is almost impossible to avoid all of these plastics when purchasing food items.
	Blue box is a must for apartments, townhouses, co-ops, etc.
	Development of markets for recycled HDPE or PET.
	The blue box system is not the long-term solution and misleads the public. Rather than adding new items, spend more effort on reuse and reduction.
	To reduce costs, why doesn't the City implement at source separation for household/apartment glass, cans etc.
	Tax individuals who don't use their blue box.
	Collect newspapers once a week and food and yard waste alternately. Why is the proposed waste wood proposal by Q&O Paper taking so long to get off the ground? a) dispose of wood; b) provides electrical energy. It has been over 2 years on the books - to my knowledge - get this going.
	Could a means of recycling cereal boxes be introduced? "Everfresh" juice bottles can be returned and reused in other provinces, why not in Ontario?

Reference Document/ Source	Comment
	I feel the blue box program is a total failure, and represents the blatant misuse of public funds. It was initiated by the soft drink bottlers, an industry that should have been forced to start reusing bottles. Let's start by looking at reusing all drink bottles. Items such as newspaper, tin should of course be recycled. The blue box program should not be costing taxpayers money.
	I live in a small apartment building where we are unable to recycle because of lack of room for the bins outside the building. What sort of provisions are being considered for the large number of urban people that are in the same situation as myself? More pressure should be put on landlords (both residential and business) to plan for recycling space/ facilities in their new building projects.
	Make sure consumers have more "post consumer" recycled products available.
Master Plan "3Rs" Comments	Centres should be established now where people could deposit styrofoam trays, plastic bags and paper (other than newspaper) etc. This will create incentive for commercial recycling by creating a stockpile of these items. Don't penetrate bureaucracy.
	I agree that it is extremely important to have more public domes, as well as mandatory recycling and composting for restaurants. They produce a lot of waste which could be recycled or composted.
	Insist on having appliances repaired instead of buying new ones. Don't buy non-recyclable bottles. Reduction should begin as soon as possible.
Master Plan "3Rs" Comments	You are focusing far too much effort on recycling. People throw everything into the blue box because they believe that recycling solves problems. What this does is make the collectors and sorters life very difficult and inefficient. You want to add aluminum, magazines, etc. - don't be crazy! Strongly stress that consumers must drastically alter their spending habits are responsible for waste.
	People should be charged for the plastic bags they get at food stores. As a cashier, I am asked to double, even triple-bag groceries. Some people even ask for four bags.
	I don't have a car and we don't have a recycling program in our building. My small son tells me to recycle all the time but there is no depot close by. We should go back to using paper bags to store nails in etc. rather than plastic containers.
	Our management refuses to have a recycling program in our apartment building.
	Metro Toronto should actively pursue better recycling facilities - let's stop spending money on useless programs and build some recycling facilities.
	Canada needs to emulate European recycling.
	Can you recycle materials without causing a health hazard, e.g. glass?

Reference Document/ Source	Comment
	Can styrofoam be recycled?
	Is plastic packaging recyclable?
	I heard our glass is going to the U.S. to be recycled - I don't approve.
	I would like to see more blue domes around so we don't have to travel as far to recycle stuff from our apartment.
	Why didn't they start recycling years ago? It costs three times as much. I don't believe in reducing or reusing, I believe in recycling.
	Reduce the cost of recycling drywall scrap so that people can make a living. So that we don't have illegal dumping and competitive prices of SOBs. You are ruining our profits.
	It used to be easy to find a drop box to donate things not needed. This recycled a lot of things which now go to garbage. Good Will does not take furniture any more when there are more needy people who could use cheaper furniture.
	Your reuse program sounds great but each morning when jogging, I see so much "good" garbage at the curbside. Garbage collections should refuse items that could be donated or recycled.
	The less multiple handling the more cost effective: need for trucks geared to separation on pick up and ability to dump contents into facilities which can be themselves loaded for transport to specific recycling plants. Blue Box: add magazines, rigid aluminum foil, rigid plastics and plastic bags. MRF facilities should be set up so minimum rehandling is required.
	I would like to see an environmental tax on products such as disposable diapers and non-refillable bottles and use the money to promote the 3Rs.
	Shopping centres where there are convenience stores produce a lot of waste cans, bottles, packaging. Should have receptacles for such. Recycling Co-op appears to need the market-end established.
	Ban non-returnable bottles and cans.
	I've heard rumours that soon Metro Toronto may consider stopping the Blue Box Glass Recycling Program. Apparently, there is a glut of glass. Why not maintain the program, dump the glass in piles and pulverize it with dozers. This product could then be used for covering other indisposable waste while cutting down on the bulk of unbroken bottles until another use is found for product.
	Schools could have drop boxes for paper (used on side) as well as for other reusable items.
	We have started our recycling program at our office where we recycle paper, use "Paper Option" recyclers, use mugs and not styrofoam, etc. We do the same with food, i.e. when lunches are catered, we send intact leftovers to Food Share or Second Harvest. There is a lot of food (in offices) being thrown out when it could be feeding the homeless.

Reference Document/ Source	Comment
	Professional gardeners must be encouraged to use clear plastic bags for garden - grass clippings instead of green bags which end up in a landfill.
	Is there a way to recycle magazines?
	Too much emphasis that has been placed on recycling has blurred the importance of reducing and reusing first.
	I presently bring the pop cans and newspapers home from work for recycling. Although this is not a problem, one of the biggest garbage areas is the office paper - what can be done with this?
	I agree that reduction is the most important of the 3Rs. Blue boxes have made people complacent about the 3Rs. They think that filling a blue box is all they have to do. We must develop new markets for recyclables.
	Tax or forbid non-returnable bottles.
	We must move towards reusable soft drink bottles - perhaps eliminate cans.
	Extend what can be recycled and encourage reuse or recycling of construction materials.
	Deposits should be put on glass bottles and refunded once returned.
	Make recycling of cardboard easier - too much of a pain.
	We follow the green consumer's guide but would like to see more informative ads on what to recycle certain products, i.e. saran wrap, household items too bad to repair, light bulbs, and old, small appliances.
	Small appliances should come with spare parts and rather than throwing away, one could repair it themselves.
	Before we start collecting materials for recycling, we should establish that the facilities for recycling are in place and have a use for these materials. There seems to be tendency to collect first and end up with piles of materials we don't know what to do with, i.e. tires, newsprint, glass, etc.
	Would really appreciate if apartments/condos were included in the recycling program - easier than taking to depots.
	Keep pressure on the Liquor Control Board for refillable bottles.
	I would like fine paper to be added to Metro Toronto's recycling collection program. Since I am a student, I use a lot of computer and notebook paper and would like to have the used paper recycled.
	The 3Rs should be applied to used building materials which appear to represent a significant proportion of the garbage in the City dumps.
	Recycling programs should be designed in conjunction with the processors of the recyclable material.
	More 3Rs should be done in malls as well as in the industrial sector. The dome should recycle more than just cups.

Reference Document/ Source	Comment
	Emphasize patronage of Good Will, Salvation Army, etc. for reusable items (you would not believe what is thrown away - e.g. furniture, appliances, even computer equipment - at curbside. Establish community resource places like "Wastewise" in Georgetown (as both recycling centres and material exchange facilities. Make more items more "blue boxable".
	Would it not make more sense to return recyclables. It seems to me that collecting recyclables is expensive and burns a lot of energy. I'm already going to the store, why not return the recyclables there?
	Encourage builders "Do-it-your-selfers" to take solid lumber cuttings - dimension lumber to pre-arranged depots for free distribution for firewood or reuse in projects - cottages, etc.
	Reduction of waste must become as widely accepted as recycling is now.
Master Plan "3Rs" Comments (continued)	Bring back the reusable glass milk bottle and reduce the quantity of soft drink cans and assign deposits to remainder.
	Collect and recycle scrap metals, e.g. pots, metal pipes, etc.
	Encourage and develop recyclable sanitary products for women. Encourage by funding research recycling plants for plastics, chemicals, and construction waste.
	I want to know what Metro Toronto is doing to apprehend the environmental "criminals" in Toronto, i.e. big businesses and government. Shouldn't the emphasis be on reduce before anything else. All I see is recycle, compost, etc.
	Promote yard/garage/street sales to promote the reuse of materials.
	Move immediately to collect clothes, furniture, etc. for Goodwill. Also consider the Third-World markets for some items.
COMMENTS ON MOEE WASTE REDUCTION OFFICE INITIATIVES PAPER NO. 1	
	Consider quarterly or monthly reports to the MOE by municipalities at least for diversion quantities and value of materials.
	Perhaps it should be mandatory that all waste generators participate in the source separation program since the municipality is required to provide one.
	Consider disposal ban.
	Mainly funding and cost concerns expressed.
	Should specify that recyclables must be collected when garbage is collected or set a minimum time period within which a municipality must collect source separated materials.
	All agreed that infrastructure was in place to handle and process any amount of steel collected - it was believed that the major problem is in collection.
	White goods not economically viable for recycling.

Reference Document/ Source	Comment
	The existing infrastructure allows food and beverage cans to be consumed directly by the mills - all other forms of "ferrous" items will require the facilities of the scrap industry to process these articles in order to remove the non-ferrous materials. The logistics and frequency of pick up would be based on the needs of the individual municipality.
	Collection system does not exist to accommodate the other ferrous items generated.
	Steel industry can accommodate increase volume of ferrous that would result - likely to displace a portion of imported scrap.
	Avoid any regulations with regard to flow control of source separated materials.
	Infrastructure exists to handle increased volumes of aluminum - improvement needed in collection systems.
	Suggestion that UBCs and food cans be collected by the Blue Box with other aluminum products being collected by the municipality on special pick up days or being dropped off by residents at special sites.
	Comment that municipal source separation should be in place before ICI program so that they can work together.
	Can the province cease to provide funding if the company ceases to recycle.
	Guidelines for source separation are needed especially with respect to what it is in terms of selected recyclable materials and to what extent it should be carried out.
	Concern on marketability of compost.
	People should be encouraged to leave grass clippings on the lawn - this is consistent with the 3Rs hierarchy which stresses reduction over reuse and recycling.
	Why aren't ICI businesses with large properties producing a significant amount of leaf and yard waste being required to compost.
	Why not give grants to persons/companies that reach the targets i.e. incentives or disincentives.
	Problems exist with existing composting sites in terms of cost and pick up.
	Should encourage backyard composting of household leaf and yard waste.
	Should consider the fact that municipalities with less dense populations may not be able to implement recycling infrastructures as conveniently as those with more dense population bases.
	Budget implications - taxpayers are reaching the limit of what they can afford to pay in taxes.
	Education, training of staff and enforcement may be beyond the financial and staff capabilities of the smaller municipalities.

Reference Document/ Source	Comment
	Rural townships may not be able to afford the composting systems which the MOE is suggesting - this may be a particularly unnecessary hardship if the municipality's residents are already using alternate means of organic waste disposal.
	Incentives such as high tipping fees and low cost recycling tipping fees are perhaps as useful as audits and workplans as business people will practice the 3Rs given the financial incentive to do so.
	Perhaps require greater market development for the materials we currently recycle before we consider expanding the blue box to include additional materials.
	Given that composting of organic waste presents a better alternative than landfilling it, and that whatever contamination exists in the waste would reach the environment in any case, there will be no undue restrictions imposed on composting or the end use of composted material.
	The economic viability of a sustainable 3Rs program is based on 4 principal factors: disposal cost avoidance, availability of markets/material quality, market pricing for materials, recovery costs to separate, collect and sort.
	Concerned that regulating additional materials into blue box could result in unreasonable additional collection and processing charges by contractors for municipalities under existing programs.
	In some instances it makes more sense to chip the woody material and use it in chip form rather than composting it.
	Financial impacts to municipalities and the ICI sector must be included - must not be treated as an afterthought.
	Residents should be encouraged to do their own backyard composting - central composting is not cheap.
	The multi-material recycling site is limited in the materials it would accept. There would appear to be no opportunity for recycling of other materials as technology or markets develop.
	Favour the voluntary approach of NAPP. Suggest that the ICI sector is given guidelines for waste minimization with regulations as a backdrop which could be enacted through enabling legislation as necessary.
	Should give consideration to legislation to increase the level of recovery of recyclables in both existing and future residential blue box schemes, either by compulsory source separation or by legislating pay by the unit, rather than flat rate system.

Reference Document/ Source	Comment
	This person has proposed an alternative program including the following components: -landfill bans especially on one way and disposable items and certain types of packaging -source separation should take on a Wet/Dry approach with a companion HHW program -manual sorting at MRFs to be done by welfare and unemployment insurance recipients -those recyclables which are presently difficult to market can be stored at a "monolandfill" until they can be used -a change in the tax structure that would favour recycling industries and recycled materials over virgin ones -municipalities should be required to establish community reuse centres to accept potentially reusable goods and to repair items - individuals could take any items they can use.
	Land application of leaves should be considered as an alternative to a composting program providing a more economical and desirable method for recycling of leaves. This application may well fit in to the same method for the disposal of yard waste.
	The MOE should place more emphasis on establishing markets, developing the financial and technical systems to direct materials to a productive use, and implementing public education programs.
	All municipalities should be required to implement source separation and leaf and yard material composting.
	There needs to be increased emphasis on market development and funding should match that emphasis.
	There should be serious efforts to make the system reflect the true costs of various commercial and industrial practices and to try to make the economic impact bear on those that create waste/ environmental problems.
	Recommend a massive consumer education program be taken by industry and government to help consumers.
	The paper tends to focus on recycling as the key to waste reduction over the first two Rs of reduction and reuse - there should be more reduction and reuse programs implemented and the public should be educated and made aware of these programs.
	People should be encouraged to compost at home in the backyard or through vermicomposters - this would also eliminate some of the collection problems.
	Kitchen scraps should be composted - perhaps by centralized composting service for individual homeowners or at the least the MOE could promote backyard composting.

Reference Document/ Source	**Comment**
	The government should ensure that recovered recyclables maintain a reasonable market value through product stewardship programs, mandated recyclable materials content in products and incentives through financial and/or regulatory means to stimulate private sector demand for these materials including co-generation of hydro through incineration of materials with energy value which are surplus to the market demand for reprocessing through recycling.
	If there is no market for a source separated material it should be stored until an end user can be found.
	Aside from handling problems during pickup, is there any reason to continue excluding window glass as a source separated material?
	It is essential that viable markets and an appropriate infrastructure be in place before new wastes are added to the list of source separated materials.
	There is a definite lack of support for waste reduction. There should be at least as much emphasis as on recycling.
	The amount of money allocated to public education is too small. Money should be available for education the public about all potential waste diversion strategies: composting, reduction and consumer power in purchasing.

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APPENDIX D

System Theme Descriptions

APPENDIX D

SYSTEM THEME DESCRIPTIONS

INTRODUCTION

The diversion system themes were developed based on the collective expert judgement of the study team, a review of comparable systems (in Ontario and world-wide), and a review of 3Rs initiatives suggested through the SWEAP, SWISC and IWA public consultation processes. The themes were considered to be types of systems which were different from the existing and Existing/Committed systems already defined for each Regional municipality and which may be used in addition to present activities.

Dominant themes identified in the course of this study include:

1) Comprehensive Source Separation without central composting;
2) Wet/Dry system;
3) End of Pipe, Mixed Waste Strategy;
4) Product Stewardship;
5) Economic Instruments;
6) Promotion/Education; and
7) Generator Based Source Reduction and Reuse.

Themes may consist of several components. For instance, an economic instrument theme may consist of a User Pay component, an advanced disposal fee, special levies etc. Any given component may simultaneously be incorporated in several themes (for instance a User Pay component may be incorporated in a comprehensive source separation theme).

A description of the dominant themes is presented below.

Comprehensive Source Separation Without Central Composting

A comprehensive source separation theme would involve separating the waste stream into a number of different categories at source. It would maximize the benefits of Existing residential systems for waste diversion in the GTA without precipitating major changes for householders from current operations. Existing dry recyclables collection and processing programs would be built upon to manage and divert as many dry recyclables as possible. This theme would be supplemented by aggressive promotion of backyard composting and

separate collections of leaf and yard waste which would divert components of the "wet" waste stream. At IC&I locations, comprehensive source separation would focus on dry recyclables and would increase source separation efforts being carried out by many IC&I locations on a voluntary basis at this time.

Comprehensive source separation may be applied to any element of the waste stream. An expanded array of dry recyclables (to include such materials as textiles, aluminum foil, OCC, wood, etc.) would be separated at source in homes and IC&I locations. Existing household containers and waste/recyclables collection systems would continue to be used for collection of recyclables, etc. Existing recycling systems would be expanded to collect and process an increased supply of dry recyclables.

Wet/Dry System

The term "Wet/Dry" refers to a residential solid waste collection program where the householder is required to separate their waste into at least two distinct streams - wet (organic fraction), and dry (fibres, plastic, metals, etc.). Each stream is stored separately in a container (typically a plastic bag or bin) which, in the case of single family residents, is then taken out to the curb for collection. The Wet/Dry theme is applicable to any material, and focuses on diverting a larger amount of organic waste from the residential waste stream for composting at a central facility.

There are two main variations of a residential Wet/Dry system: two stream (wet and dry) and three-stream (clean wet, clean dry and residue waste). In a two-stream system, no separate residue or "garbage" option is provided to the householder, as residue is pulled from the recyclable or compostable material at a materials recovery facility (MRF) or compost facility. In a three stream residential system, a separate garbage option is added.

Implementation of a comprehensive Wet/Dry system for residential waste would require construction of larger MRFs to handle an increased quantity and array of dry recyclables. Central composting facilities would be required to process the "wet" organic fraction of the waste stream.

Implementation of a comprehensive Wet/Dry system for IC&I waste would require source separation of organics by some IC&I generators for separate collection and management. "Wet" wastes are a much smaller percentage of the IC&I waste stream (7-8% versus 30-40% for residential).

End of Pipe, Mixed Waste Processing

An end-of-pipe mixed waste processing theme involves collecting waste in an unseparated state at the point of generation, and taking it to a processing facility. Here, the recyclable fractions are removed, processed and marketed, the organic materials are composted, the combustible fraction which is not recyclable may be turned into a Refuse Derived Fuel (RDF), and the residuals are landfilled.

The mixed waste processing theme is applicable to any material in the waste stream, and may focus on diverting a larger portion of organics from the residential waste stream. It would require siting and construction of large Mixed Waste Processing facilities that would contain large unseparated waste (garbage) processing areas, sorting into dry recyclables processing streams (similar to current MRF operations), and mixed waste composting facilities. Because incineration of municipal solid waste is prohibited in Ontario, under Regulation 555 of the Environmental Protection Act (September, 1992) an RDF facility would not be considered as part of a mixed waste strategy.

Mixed waste processing of the IC&I stream is likely to produce a higher quality end product, as most IC&I wastes are dry, therefore, contamination of recyclables with wet wastes is less of an issue.

Marketability of recovered secondary materials and finished compost is a key requirement for success of a mixed waste strategy.

Product Stewardship

Product stewardship may be applied to all or a few elements of the waste stream. It would generally not focus on the organic fraction of waste.

The product stewardship theme involves product manufacturers taking responsibility for the waste management costs incurred throughout the complete life cycle of products and packaging, including those which are currently externalized. Product stewardship occurs when revenues raised are used directly for the management of the designated products/packages as waste. Product stewardship initiatives may be either public sector or private sector based.

In public sector systems, Provincial and Municipal governments maintain an active role in the management of post-consumer products and packages as waste. Producers and distributors of consumer products contribute to the cost of their management as waste at

the end of their life cycle. An industry group may also contribute finances to a publicly-operated program and collect funds using a self-imposed levy, obviating the need for a tax or similar funding mechanism.

In private sector systems, industry assumes responsibility for all aspects of the management of designated products and/or packages as waste, including system design, funding and operation. The German Green Dot System is an example of this approach.

Economic Instruments

Economic instruments include taxes, levies, grants, loans, subsidies and other financial mechanisms that alter the costs and/or benefits of alternative waste management options available to waste generators. The intended effect is to influence the decision making and behaviour of waste generators, so that they voluntarily select those options that lead to waste reduction. Economic instruments may be used to raise funds for waste reduction programs and, in some cases, to incorporate environmental and social "externalities" into the prices of goods and services. Economic instruments may include the following:

- User Pay Systems;
- Input Charges;
- Product Charges;
- Waste Collection/Disposal Charges;
- Deposit/Refund Systems;
- Subsidies;
- Procurement;
- Full Cost Accounting; and
- Enforcement Incentives.

Economic instruments may be applied to any element of the waste stream, although they are unlikely to focus on the organic fraction of residential waste.

Promotion/Education

This theme focuses on using promotion and education to the greatest extent possible to divert waste from disposal. Public education is used to transfer information to a particular audience. A promotion program will motivate people to participate in a particular program, and inform the audience of a particular topic or event, such as the start of a new recycling program.

Techniques include door-to-door distribution (householder information cards, canvassing, etc.); conventional media (newspaper, TV, radio, brochures, advertisements, press conferences, etc.); community contact (block leader programs, workshops/seminars, etc.); other mechanisms (telephone hotlines, recycling surveys, etc.).

The promotion/education theme may be incorporated into any waste diversion program. Waste diversion estimates attributed specifically to promotion and education are not readily available, as these methods alone are generally used to enhance the performance of an existing waste diversion system. A strong promotion/education program is essential to the success of any waste diversion system which requires participation by householders or employees.

Generator Based Source Reduction and Reuse

This theme focuses on source reduction and reuse. Source reduction includes the design, manufacture, purchase and/or use of products and materials in a way that reduces their quantity before they are disposed. Reuse focuses on using a product as many times as possible in its original form prior to recycling or discarding the product as waste.

Source reduction measures can be applied to most materials in the waste stream. They include reducing product volume and packaging (e.g. "light-weighting" packages); increasing product life and durability; purchasing products selectively and decreasing product consumption; promoting reuse (e.g. refillable packages, reuse centres); promoting practices which decrease waste generation (e.g. alternative landscaping, zeri-scaping, grass-cycling and backyard composting).

A source reduction theme can significantly reduce waste generation for some components of the waste stream. However, no source reduction program will achieve 100% participation in a large community of varying ages and cultural backgrounds.